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ABSTRACT

An economic theory of training holds that training in technical skills and training in employment relations (namely, information reliability or the ability to quickly and reliably disseminate information among the members of the firm) reinforce each other. This theory is an organizing framework for understanding some practices at Japanese firms in Japan and in the United States. The theory stresses the link between school and training. Japanese firms enjoy a favorable environment for training. Technical training is facilitated by the low degree of heterogeneity in, and the high level of, basic skills that new employees bring from schools. Recruitment of new graduates relies heavily on recommendations of selected schools to homogenize the work force in terms of basic skills, attitude toward working and learning, and personality. Such Japanese practices as team-based production, training of young workers by experienced employees, and training by job rotation expedite the diffusion of knowledge, skills, and information within a Japanese firm. These practices, a reflection of investment in information reliability, result in a compliant and productive work force in Japanese firms. The Japanese training approach has been adapted in some Japanese automobile plants in the United States. In addition to building a homogeneous work force, these plants share another common experience: newly hired employees must be trained from scratch in elementary skills. (Appendixes include 41 references, 58 endnotes, profiles of selected Japanese automobile manufacturers, a description of the hiring process at Toyota, 4 figures, and 3 tables.) (YLB)

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Employment-Based Training in Japanese Firms in Japan and in the United States: Experiences of Automobile Manufacturers

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EMPLOYMENT-BASED TRAINING IN JAPANESE FIRMS IN JAPAN AND IN THE UNITED STATES EXPERIENCES OF AUTOMOBILE MANUFACTURERS

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I. Introduction

The international competitiveness of the American economy is a critical policy concern for the United States.[1] The key factor behind an internationally competitive economy is the ability of its labor force to adapt flexibly to continual innovation and to produce quality products at low cost. Such ability is fostered by training. The maintained assumption of this paper is that the stream of successful Japanese products in recent years owes much to the effective private sector training in Japan.

Recently, many American firms have adopted Japanese practices, such as the just-in-time inventory (*kanban*) system, the team-based production system, quality control circles, and training by job rotation, and the trend is likely to continue. Also, Japanese direct investment in the United States has risen substantially in recent years and is likely to keep growing in the future. Yet, there has been little systematic discussion of how the Japanese style training and employment relations function and how suitable they are to the American labor force. An understanding of Japanese training promises to offer valuable policy lessons for improving the competitiveness of the American labor force. To help promote such understanding, this paper presents an economic theory of training and uses it to assess the initial experiences of Japanese automobile transplants in transferring Japanese employment and training practices to the American labor force.[2]

Since much of the information in this paper pertains to the automobile industry, it is useful to first note how this industry's productivity characteristics differ in the two countries. Fortunately, the relevant information is readily available in a recent publication summarizing the findings from a large project conducted at the Massachusetts Institute of Technology (Womack *et. al.* 1990). It has been said that automobile workers in Japan require fewer hours of work to assembly a car, and produce higher quality cars, than their U.S. counterparts. The MIT study confirms this claim: in 1989 Japanese assembly plants built an automobile using 16.8 hours of labor on average, Japanese transplants in North America, 20.9 hours and U.S. owned plants in North America, 24.9 hours. The number of assembly defects per 100 vehicles averaged 52.1 for Japanese plants, 54.7 for Japanese transplants, and 78.4 for U.S. plants.[3]

There is, of course, a considerable diversity in assembly productivity and quality within Japan as well as within the United States.[4] In fact, the best U.S. owned plant in North America outperformed the worst plant in Japan: 18.6 hours for the U.S. vs. 25.9 hours for Japan. An eye opener is that the best U.S. owned plant evidently produced cars with slightly higher quality (35.1 defects) than the best Japanese plant (37.6 defects) (Womack *et. al.*,pp. 84-88). The evidence seems incontrovertible, however, that on balance Japanese automobile plants rank the highest in both productivity and quality followed by Japanese transplants and then by U.S. owned plants in North America.[5]

Perhaps most significant for the current study is the finding that workers in Japanese transplants in North America, *most of whom are American*, produced at a level of quality comparable to that at Japanese plants. Interestingly, transplant workers and workers in Japan receive similar amounts of training, far exceeding what workers in U.S. owned plants receive, at least during the initial period of employment: new production workers in Japanese transplants receive an average of 370 hours of training as compared with 380 hours for workers in Japanese plants and a mere 46

hours for workers in U.S. owned plants.[6] The above findings suggest that nationality per se is not what explains the difference in productivity between assembly workers in Japan and the U.S. Rather, training, employment relations, and the production organization--e.g., mass production vs. lean production--are likely to be the explanatory factors.[7]

This paper views employment-based training as the primary vehicle for developing productive workers. What are the key features of a productive worker? The following remark by Alfred Marshall, from the chapter on industrial training penned more than a hundred years ago, remains to this day a fitting description of a productive worker.

> To be able to bear in mind many things at a time, to have everything ready when wanted, to act promptly and show resource when anything goes wrong, to accommodate oneself quickly to changes in detail of the work done, to be steady and trustworthy, to have always a reserve of force which will come out in emergency, these are the qualities which make a great industrial people...Alfred Marshall, Principles of Economics, Book IV, Chapter VI.

The creation of the "great industrial people" that Marshall talked about requires close coordination between formal schooling and employment-based training.[8] Moreover, the Japanese experience suggests that an effective employment-based training must include not only technical training but also training in employment relations. The benefits from investing in technical skills are straightforward; indeed, most writers on training issues have focused on this type of training. Training in employment relations teaches employees how to communicate effectively with co-workers, how to share information and responsibilities, and how to teach fellow workers, as well as how to deal with conflict situations. Although such training may be difficult to measure, to ignore it would be to stop short of gaining a full understanding of training issues.

The emphasis on training in employment relations is especially appropriate for contemplating policies to strengthen U.S. industries. One often hears that promoting job security for American workers is fundamental to developing a productive workforce. Although such a recommendation may have merit, job security should not hinder *efficient* separations from occurring. An employment-at-will arrangement, which is typical in both U.S. and Japanese labor markets, ensures efficient separations. The problem is that, as my theory below demonstrates, inefficient separations also occur from time to time. An important purpose of training in employment relations is to reduce inefficient separations to a minimum. In the concluding section, I argue that this type of training should be an important component in policies on human resource management in American companies.

The paper is organized as follows. Section II presents a theory of training, Sections III and IV use the theory to discuss hiring and training practices in Japan and at some of the Japanese transplants in the United States. Section V offers concluding remarks.

II. A Theory of Training

1. An Outline

The theory presented in this section aims to clarify the links between schooling and training, and between technical training and training in employment relations. Figure 1 gives an overview of my conceptual framework.[9] The employer and employee are assumed to invest in training in order to enhance the value of their relationship. Figure 1 distinguishes between two types of training, indicated in circles: (1) training to enhance the employee's technical skills and (2) training in employment relations. The independent variables are indicated in Figure 1 as the costs associated with these investments. The cost of training in employment relations reflects the environment--the extent of heterogeneity of the workforce, its ability to function cooperatively as a group, management attitudes, worker propensity for mobility, and other "cultural" factors (cf. arrow a). Figure

1 indicates that the environment is shaped in part by formal education (cf. arrow b). Also, the cost of training in technical skills is a function of how well basic education prepares students for training (cf. arrow c). The next several paragraphs will develop these ideas further.

It is well known that workers with better academic skills are more efficient learners on the job (Rosen 1986).[10] A solid education in literacy and numeracy, as well as in the attitude towards continuous learning on one's own, is a prerequisite for efficiency in post school technical training (cf. arrow c). Also, as noted earlier, training in technical skills is facilitated if new employees arrive with solid basic skills with little variability among them. If every new employee comes equipped with a solid basic education, the time needed to teach technical skills on the job is reduced, because, for example, self-studying can be relied on for much of technical training.[11] In Japan, there is a tradition in which older and experienced persons teach and nurture young and inexperienced persons. Teachers who produce capable students are amply rewarded. As will be discussed later, this tradition appears to have been carried over to the setting of modern industrial training in Japan, thereby lowering the cost of technical training there (cf. arrow d).

In addition to teaching basic skills, formal schooling teaches students to become good "citizens" by instilling in them skills and attitudes for effective group functioning through cooperation. This way, a good formal schooling helps shape the environment, thereby affecting the cost of training in employment relations (cf. arrows b and a). In Japan, formal education teaches traditional Japanese notions of the individual's place in society and the cooperative attitude (Rosenbaum and Kariya, 1989). School children, for example, are taught from the earliest years to perform cooperative chores such as serving school lunches and cleaning the classroom at the end of the day. This way, schools inculate students with attitudes that employers look for in new recruits (Sako, 1990).

According to Figure 1, both types of investment reinforce each other. Thus, a lowering of the cost of investing in technical skills increases the investment in these skills, and in turn stimulates the investment in employment relations (cf. arrow e). A lowering of the cost of training in employment relations increases the investment in such training, which, in turn, stimulates the investment in technical skills (cf. arrow f). As another source of interdependence, an exogenous increase in the benefits of technical skills increases the investment in employment relations, and vice versa.

Figure 1 shows that economic growth and technological progress can stimulate both types of investment (cf. arrows g and h). This prediction points to the link between training and macroeconomic and industrial policies. One might conjecture that the training incentive in Japanese firms was fostered in large part by the success of the macroeconomic and industrial policies in that country (see the comparative statics later in this section).

2. Technical Aspects

The following discussion addresses the key technical aspect of my theory, leaving the details to an Appendix (available upon request). Training investments are assumed to be firm specific. I focus on one aspect of investment in employment relations, namely, investment in information reliability. By information reliability is meant the ability to quickly disseminate information reliably among the members of the firm. The emphasis on information reliability is motivated by the fact that information becomes asymmetrical once the investments are made. As a result, wealth loss may occur from ex post opportunism (Williamson 1985). The ability to reliably exchange information within an employment relation reduces such wealth loss. Such an ability is determined by the background environment (cf. Figure 1). In particular, a favorable environment is

assumed to be characterized by a more elastic marginal cost, as well as a low marginal cost, of investment (see the comparative statics later).

Contract flexibility is central to my model of training. It increases the returns to training investments by allowing quick adjustments to newly emerging conditions. For analytical convenience, I distinguish among three types of contracts. An ideal contract would stipulate that all of the relevant new information be incorporated at once into contractual arrangements. The value of an ideal contract is denoted by M^*. A rigid contract would stipulate that none of the new information be incorporated until the contract comes up for renewal. The value of a rigid contract is denoted by M_1. A flexible contract permits some adjustments to the new information to be made automatically during the life of the contract. The value of a flexible contract is given by M_2.[12] Although the model is formulated in terms of wage flexibility, the analysis of flexibility in other dimensions of employment relations will be similar in spirit.

The model assumes that the employee and the employer enter into an employment relationship in the first period by specifying the wage schedule and the amounts of investment. Investments are assumed to take place during the first period. At the beginning of the second period, productivity is revealed, and the parties decide to stay together or to separate. In an ideal contract, the parties could easily agree on the realized values of productivity, no asymmetry of information exists, and all separations are efficient. If information is asymmetric, the ideal contract may not be feasible. In employment relationships, information asymmetry seems inevitable: the employer is likely to be better informed about the employee's contribution to the firm, and the employee is better informed about his alternative value.[13] Moreover, each party may have an incentive not to reveal his information truthfully. Since investments are assumed to be firm-specific, the parties in this case will share the investments in order to reduce inefficient separations caused by information asymmetry (Becker 1962, Kuratani 1973, Hashimoto 1981).[14]

If information is asymmetric, the ideal contract is infeasible and the parties choose between a rigid and a flexible contracts. With either contract, inefficient separations occur, reducing the incentive to invest in the employment relationship.[15] With a rigid contract, the parties agree not to exchange information in the second period. In a flexible contract, the parties try to reduce inefficient separations by agreeing on at least the approximate values of the productivity magnitudes, and, as a result, some exchange of information takes place. The information so exchanged, however, will contain "errors of measurement."

Let us represent the extent of errors of measurement by σ. My analysis results in the expected value of a flexible contract in the following general form:

(1) $M_2 = M^* - \phi(\sigma)$, where $\phi(0) = 0$, $\phi(\sigma) > 0$, and $\phi' > 0$.

where M^* is the value of the ideal contract. Note that M_2 approaches M^* as σ approaches zero.

The parties choose between the rigid and the flexible contracts by comparing their expected contract values. Such a comparison is represented as a contract frontier, $\hat{M}$, written as:

(2) $\hat{M} = \text{Max}\ (M_1, M_2)$.

The contract frontier is illustrated in Figure 2. Since there is not exchange of information in a rigid contract, M_1 is independent of σ. For small values of σ, M_2 is greater than M_1, and the flexible contract dominates.[16] As σ increases, M_2 falls: the more errors of measurement there are the lower the returns to investment. The value of M_2 eventually becomes equal to M_1 at $\hat{\sigma}$. Beyond $\hat{\sigma}$, M_2 is smaller than M_1, and the rigid contract dominates. The contract frontier is kinked at $\hat{\sigma}$.

Investment in Firm-Specific Technical Skills

The optimum investment in technical skills, h, is determined by equating $\hat{M}$ with the exogenous marginal cost, ω', of producing h.

(3) $\hat{M} = \omega'(h)$,

where $\omega'(h)$ is the marginal cost of investment. This cost is incurred at the time the contract is signed. Figure 3 portrays the relevant magnitudes.

Obviously, the greater the $\hat{M}$, or the smaller the ω', the larger is the optimum h. If a flexible contract were chosen, a reduction of σ would increase $\hat{M}$ $(= M_2)$, and would increase the optimum h.[17] To sum up the main points so far: the smaller the σ the more likely that a flexible contract is chosen, and if a flexible contract is chosen, the smaller the σ the larger is the optimum h.

Investment in Employment Relations

Parties may reduce σ by spending resources on screening job applicants, decreasing the asymmetry of information, and improving the quality of communication. Call this activity an investment in $-\sigma$. The cost function for this investment is given by:

(4) $\lambda = \lambda(\bar{\sigma} - \sigma)$, $\lambda(0) = 0$, $\lambda' \geq 0$,

where $\bar{\sigma}$ is the value of σ that would prevail if no resources were spent on reducing it.[18] Equation (4) states that the cost is a positive function of the amount of σ reduced, and that the marginal cost is upward sloping. The total return to this investment is given by:

(5) $R(\sigma, h) = 0$, for $\hat{\sigma} \leq \sigma \leq \bar{\sigma}$

> 0, $R_1 < 0$, $R_2 > 0$ for $0 \leq \sigma < \hat{\sigma}$.

Obviously, this investment is made only when a flexible contract is chosen. In that case, the parties solve the following program:

(6) $\underset{\sigma,\ h}{\text{Max}}\ \pi = R(\sigma, h) - \lambda(\bar{\sigma} - \sigma) = M_2 h - \omega(h) - \lambda(\bar{\sigma} - \sigma)$

The first order conditions for the optimum are:

(7a) $\partial\pi/\partial h = M_2 - \omega' = 0$,

(7b) $\partial\pi/\partial(-\sigma) = \partial M_2 h/\partial\sigma + \partial\lambda/\partial\sigma = 0$.

Equation (7a) equates the marginal revenue of h with the marginal cost, and Equation (7b) equates the marginal revenue of $-\sigma$ with the marginal cost.

Figure 4 illustrates the solution. The function R' is the marginal revenue associated with $-\sigma$, where h^* is the optimum value of h, and λ' is the marginal cost. The marginal revenue is zero until σ is reduced by $(\bar{\sigma} - \hat{\sigma})$, becomes positive at that point, and is specified for simplicity to be horizontal until σ is reduced completely to zero, i.e., $(\bar{\sigma} - \sigma) = \bar{\sigma}$. Three outcomes are depicted in Figure 4 depending on the marginal cost function, λ'. If the marginal cost is λ'_a, it doesn't pay to reduce σ at all, and a rigid contract is chosen. If the marginal cost is λ'_c, σ is reduced entirely by $\bar{\sigma}$, and the ideal contract is adopted. If the marginal cost is λ'_b or $\lambda'_b{}'$, the error is reduced by $(\bar{\sigma} - \sigma^*)$, and a flexible contract is chosen.

In a competitive equilibrium, the investment costs, $\omega + \lambda$, as well as the benefits, are shared between the parties to make the respective profit zero in the long run. The employee may pay for his share of the cost either by accepting a lower wage than his productivity in the first period, or by paying an "entrance fee" at the time of employment (Becker 1962, Kuratani 1973, Hashimoto 1981). Although investments in technical skills and employment relations lead to long-term employment attachment, the above model guarantees that efficient separations always take place as long as each party retains the right to separate.

3. Comparative Statics Discussions

Given the R' function, a lowering of the marginal cost, λ' increases the information reliability and therefore increases the contract flexibility. Given the λ' function, a lowering of the marginal cost of investing in h will increase the investment in $-\sigma$ by shifting R' upwards. Also, the more elastic the λ' function, the greater is the increase in investment in $-\sigma$ that would result from an upward shift in R'.

The marginal cost function, λ', is shaped by the background environment (cf. Figure 1). I argue that a more favorable environment is associated with a greater elasticity, as well as a lower level, of the

marginal cost of investing in information reliability. A more elastic marginal cost means that an increase in the investment in $-\sigma$ entails a smaller increase in the total cost. Thus, an upward shift of R' increases investment more, the more elastic the λ' function. In Figure 4, if the marginal cost were λ_b'', an upward shift of R' would increase the amount invested in $-\sigma$ more than if it were λ_b'. An improvement in the marginal returns, therefore, stimulates the investment in information reliability more in a more favorable environment, that is, such an improvement interacts with the quality of environment in affecting the investment. Also, the two investment types interact with each other: the lower the marginal cost the more is invested in $-\sigma$, which raises M_2. An increased M_2, in turn, stimulates the investment in h.

An autonomous increase in h induced by a downward shift in ω' may stimulate the investment in $-\sigma$ by raising R'. Given the marginal cost λ_a' in Figure 4, for example, it initially does not make sense to reduce σ. However, it is easy to visualize the R' function shifting upward enough to make it attractive to begin reducing σ. Obviously, if it made sense to reduce σ to begin with and if σ has not already been reduced to zero, an increase in h will lead to a further reduction in σ.

Japanese workers are said to invest more in the employment relationship, and they have more flexible contracts, than U.S. workers (Hashimoto and Raisian 1989, Mincer and Higuchi, 1988, Hashimoto 1990b).[19] Also, work organization and industrial relations in Japan have been found to exhibit greater flexibility than in most other developed countries.[20] These findings can be understood as reflecting Japan's more favorable environment for investing in both h and $-\sigma$, characterized by lower and more elastic cost functions.

Another result concerns the effect of technological progress on the incentive to invest in the employment relationship. The effect of technological progress on Japanese investments in firm-specific human capital and earnings have received some attention in the literature (Tan

1987, Mincer and Higuchi 1988). A uniform productivity increase, widespread throughout the economy, can be shown to increase the incentive to invest in h and in $-\sigma$ by shifting R' in figure 4 upward, without affecting the investment costs (Appendix available upon request).

The above result suggests an explanation as to why the Japanese investment in employment relations became pronounced in the 1960's.[21] That was the period when rapid technological changes occurred and the growth rate of the economy began to accelerate. An important development was the launching of a productivity enhancement campaign to increase the international competitiveness by importing modern technologies from the United States and Europe.[22] The campaign, coordinated by the Nihon Seisansei Hombu (Japan Productivity Center) established in March 1955, helped guide private industries to acquire modern Western technologies, thereby leading the way for the double-digit growth rate of the Japanese economy during the 1960's.[23] Major labor unions and leftist politicians initially opposed the campaign vigorously, fearing that modern technologies would displace labor and cause high unemployment. The campaign eventually gained support from unions and politicians based on three principles, (1) to prevent unemployment of workers who would be made redundant by new technologies (the principle of job security), (2) to promote joint consultations between management and labor concerning the introduction of new technologies and related matters, and (3) to promote a fair sharing of the gains of new technologies among employers, workers and consumers. Joint consultations and unemployment prevention have become ubiquitous features in the landscape of Japanese industrial relations.

Given the historical background of the campaign, it is reasonable to view the economic growth and technological change of the late 1950's to be exogenous for my model. The high rate of economic growth in the early 1960's further stimulated the investment in technical skills. The increased demand for technical skills, in turn raised the benefit from an increased information reliability, and this process was boosted by the low-transaction

cost environment that prevailed in Japan. These investments helped foster a strong sense of identification with, and commitment to, the company on the part of both the management and the worker (Cole 1979, p. 253).

III. Private Sector Training in Japan

The theory just presented indicates that training in technical skills and training in employment relations (information reliability) reinforce each other. The relative importance of these training investments are determined mainly by the cost functions reflecting the background environment. This theory serves as an organizing framework for understanding some of the practices at Japanese firms in Japan and in the United States. The discussions in the following two sections are based in part on the information obtained by interviewing management level employees, both Japanese and American, at some of the transplants as well as at Honda Motors in Japan. The Appendix A provides profiles of these companies.[24]

Our theory stresses the link between schooling and training. The relative role of schooling and employment-based training in creating productive workers differs among countries and among industries within a country. On balance, the Japanese approach to building a productive workforce since the end of World War II has relied heavily on employment-based training and the United States more on training offered by outside sources such as vocational and professional schools and training institutions (Stern, 1990). The Japanese approach, in my view, reflects the importance placed on training in employment relations rather than merely on technical training.[25]

In Figure 1, the background environment is shown to critically affect private sector training. It has been reported, with a tone of disapproval, that the Japanese felt it "most efficient to have a homogeneous workforce which they believe has the same values and behavior" (Gelsanliter 1990, pp. 94-96). My analysis suggests that an emphasis on homogeneity has economic validity. Homogeneity in literacy and numeracy, in willingness to

learn new skills and to teach others, and in the ability to function as team members lower the costs of investments in both technical skills and employment relations.[26] In this context, recall that science achievement test scores have been found to have greater coefficients of variation, as well as lower averages, in the U.S. than in Japan.[27] With a workforce that is homogeneous in basic knowledge and willingness to learn new skills, employers can rely upon on-the-job learning and self-study to train new employees.[28]

To digress, let me note an example of what appears to be a U.S. historical precedence on investment in employment relations. In particular, Henry Ford's celebrated five-dollar-day program, introduced in 1914, contained an element of investment to deal with worker heterogeneity. In the early 1900's, most of Ford's workers were recent arrivals to Detroit and many were new immigrants: in 1915 more than fifty languages were spoken at Ford's Highland Park plant (Womack *et. al.* 1990, pp. 30-31). In my view, Ford made two types of investments in employment relations to deal with worker heterogeneity. First, it is well known that he introduced an extreme division of labor in his mass production system (Raff 1988). Such an arrangement reduced, if not eliminated, the necessity for workers to communicate with one another. Second, Ford introduced a system of inspection and certification to homogenize them with respect to certain productivity attributes. Thus, according to Raff and Summers (1987), some 150 Sociological Department inspectors visited homes of all workers in order to inculcate them on Ford values and to certify them for the Five-Dollar Day program.[29]

Recruitment is the first important step in creating the right workforce for successful training. Most hiring in Japan takes place in spring when students graduate from high schools and colleges. New hires arrive ready and malleable for employment-based training. Japanese employers stress academic achievement in their hiring decisions in contrast to the U.S. situation where academic achievements rarely serve as a hiring

criterion (Bishop, 1990).[30] In Japan, schools, which are in the best position to judge students' achievements, perform much of the screening function through "semiformal" arrangements with specific high schools. Many employers have established on-going relationships with particular high schools to help recruit their graduates year after year.[31] In hiring for production and clerical jobs, for example, employers, especially large ones, rely extensively on the recommendations from high schools.[32] These recommendations are based mostly on academic achievements (Rosenbaum and Kariya, 1989). In some cases, employers also administer their own tests, though this practice is becoming less common recently given the shortage of high school graduates.

New recruits in Japanese firms receive concentrated orientation sessions in safety and corporate culture (*fudo*) followed by a period of intensive training in technical skills.[33] Training does not end there, however. It continues throughout an employee's tenure in the firm. An employee becomes trained while working side by side with experienced workers and participating in the consensus-based decision making and in such team activities as quality control circles and suggestion systems. At Honda Motors in Japan, for example, high school graduates spend one month in orientation training, learning safety and company philosophy. They then enter the shop floor for another month in which about 50 percent of their time is spent on technical training and the rest on production. Informal on-the-job training takes over afterwards. After 8 to 10 years, they are evaluated and sorted into technical or management tracks, each tracks offering further training. Most college graduates are sent to the main office, where they are trained for a multitude of tasks including sales and on-the-shop technical skills.

Partly because of worker homogeneity in the basic knowledge, much of technical training in Japan relies on self-study by the workers: they are simply asked to study manuals or books on their own.[34] At Honda Motors, for example, workers are also encouraged to keep a diary of what they learned on

the job and write down the questions they want to ask the next day.[35] A manager of the Japanese automobile transplants indicated that with the American workforce he cannot rely on self-study for technical training, partly because the diversity in the level of the basic knowledge among the workers makes such an approach an unreliable device for training.

Training in employment relations is much less circumscribed than technical training. It requires a major input of time spent on sharing information among members of the firm. In this regard, training in Japan takes place even outside the work place: Japanese employees, managers and non-managers alike, "socialize" frequently after work in restaurants and bars as if with family members or close friends. Such socializing is considered to be more important for younger employees than for those with long tenure in the firm.[36] These activities promote cooperative employment relations and raise productivity. Clearly, this is one Japanese practice that will be difficult to adopt to American workers, who place a greater value to time spent at leisure and with families.

The Japanese tradition of hierarchical teaching seems to have been carried over to modern industrial training. In Japanese firms, a large part of training in both technical skills and employment relations is conducted by senior workers, who consider it their duty to teach younger, less experienced, workers.[37] In fact, a key criterion for promotion in a Japanese firm is one's ability to teach co-workers. In a Japanese firm, a senior employee need not fear becoming less valuable to the firm should he end up training his subordinates to be more knowledgeable than he. On the contrary, a successful trainee is considered a credit to the senior employee, who in turn is judged to be all the more valuable to the firm. This feature no doubt is supported by the environment of "lifetime" employment, in which the newly trained worker is not a threat to the trainer's job security.[38] One of the major challenges facing the Japanese automobile transplants in the U.S. is training their employees to be willing to teach less experienced fellow workers.[39] This finding is ironic since

Japan learned from the United States--through the General Headquarters (GHQ) of the Occupation Authority--the importance of training supervisory employees in job instruction during the years immediately following the end of World War II (Nihon Sangyo Kunren Kyokai, 1971, pp. 330-345).[40]

Much has been said about the team-based production in Japanese manufacturing.[41] An aspect often neglected in the discussion on this subject is that it can be viewed as a device for investing in employment relations. At the heart of a productive team work is the ability to share information and responsibilities. Japanese training emphasizes training to share information and responsibility to carry out a task. Imagine a situation, for example, in which a supervisor asks a subordinate worker to fix a glitch in the production process. A Japanese worker would see such a request as an opportunity to prove his value to the firm. He would take it upon himself to contact all conceivable parties for advice and information, and those contacted, in turn, would be trained to provide help willingly on the spot. Should he fail to come up with a solution, he would not be penalized. Instead, if he solves, say, nine out of ten problems, he will gain respect and his promotion prospect is improved. In turn, others depend on him, when called upon, to provide help. In contrast, an American worker would tend be reluctant to seek advice unless his superior specifically requests such action, and many of those contacted would be equally reluctant to be cooperative with help and advice.[42]

A unique training device in a Japanese firm is the employee rotation system. This system is a "life-long" process in which a worker is rotated among several assignments over many years rather than the commonly understood practice whereby a worker performs different tasks on a regular basis, say within a week. Through the life-long job rotation, an employee becomes trained in both technical skills and employment relations. Something resembling Japanese type job rotation does exist at Honda of America Manufacturing, where an associate--a term referring to Honda employees--will be cycled through several different task areas, painting,

welding, assembling, purchasing, etc., during a period of several years. Other Japanese transplants are newer than Honda, and it is too early to tell if job rotation in the true sense occurs in them.

Job rotation creates workers who are trained in intra-firm general, though firm-specific, skills. As a result, the trained worker is able to function in a multitudes of tasks, and, in Alfred Marshall's words cited earlier, to "act promptly and show resource when anything goes wrong," and "to accommodate oneself quickly to changes in detail of the work done."[43] Also, since these skills are useful in many divisions within the firm, a decline in demand in one division is unlikely to lead to a discharge of affected workers. The resulting job security encourages the workers to invest in the employment relations, to teach less experienced fellow workers, and to welcome new technologies without resistance. Also, most management level employees were once ordinary employees *within the same firm*, have gone through the job rotation process, and were members of enterprise unions. As a result, these management personnel are more closely attuned to the idiosyncrasies of the firm's operations and are able, therefore, to communicate with the employees better than managers who have been with the firm for only a short period of time.

Although informal training characterizes Japan's approach, Japanese workers do receive periodic formal training as well. These formal training programs, called off-jt, typically are designed to help workers acquire theoretical knowledge relating to what they have learned through informal training (Koike 1990). In spite of the term, such training is not always conducted outside the establishment. Larger establishments are more likely to conduct them in-house as well as offer them more frequently. Smaller firms have relied on courses taught at vocational training schools and other outside sources. According to a government survey, for example, in 1988 almost 74 percent of establishments surveyed conducted some off-jt programs. Almost 97 percent of establishments employing more than 1,000 workers

conducted such training, while the comparable magnitude for establishments with 30-99 employees was 68.5 percent.[44]

Table 1 summarizes another result of that survey. According to Column 1, most of the respondents received formal training in the past, though male workers are more likely than females to have received training. Many of the respondents evidently received formal training within the first year of employment, while some respondents received training around the time of promotion and/or at the time of job rotation (cf. Columns 2 and 3). There is a hint that education and formal training are complements to each other: workers with higher educational levels are more likely to have received formal training (cf. Columns 1 and 2). That off-jt's are offered continually is indicated by the fact that workers with higher tenure levels are more likely to have received formal training, as well as by the fact that the proportion receiving training within the recent two years is high for all tenure groups (cf. Columns 1 and 4).

It appears that formal training offered within the first year of employment has been increasing in Japan. According to Column 2, for example, 80 percent of those with tenure of less than five years received formal training, while for those with successively greater years of tenure the comparable proportions are smaller. Thus, for those with 20 years or more tenure the proportion is a little over 45 percent. Since those not receiving training are more likely to have separated than those receiving training, the trend implicit in this column may be an underestimate of the true trend.

Table 2 reports on per employee expenses for three industrial sectors. The magnitudes are relative to direct labor expense--the sum of wages and salaries, bonuses, and other cash payments. Indirect expenses per employee clearly are higher in larger establishments. Training expenses refer only to the expenses associated with formal training; even then, they do not include such items as capital costs or maintenance costs of training facilities and travel costs for staff attending courses (Dore and Sako,

1989, p.81). However, if one is willing to assume that the reported magnitudes are positively correlated with total training costs, both formal and informal, this table becomes suggestive of the pattern of training costs incurred.[45] On that assumption, total training expenses per employee tend to be higher in larger establishments. Total training expenses are likely to be higher than hiring costs, especially since training expenses likely are much more understated than hiring expenses.[46]

In summary, Japanese firms face a favorable environment for training. Technical training is facilitated by the small heterogeneity in, and the high level of, the basic skills that new employees bring from schools. Recruitment of new graduates relies heavily on the recommendations of selected schools to homogenize the workforce in terms of basic skills, the attitude towards working and learning, and personality. Such Japanese practices as team-based production, training of young workers by experienced employees, and training by job rotation expedite the diffusion of knowledge, skills, and information within a Japanese firm. These practices, a reflection of what the theory in Section II referred to as investment in information reliability, result in compliant and productive workforce in Japanese firms.

IV. Japanese Automobile Transplants

Let us turn now to how the Japanese training approach has been adapted in some of the automobile transplants. It was noted earlier that homogeneity in basic knowledge, willingness to learn new skills and to teach others, and the ability to function as team members lowers the cost of training. Creating a homogeneous workforce has been perhaps the most challenging and costly task facing the transplants. They are faced with more hiring constraints in the United States than in Japan. Unlike in Japan, for example, employers cannot use age, race, sex, or marital status in their hiring decisions. As a result, a plant's workforce is bound to be more heterogeneous here than in Japan.

To cope with the large heterogeneity of the American labor force, Japanese automobile transplants had to first invest much resources in creating the right environment with a brand new team of a few thousand employees each, and build their "corporate cultures" and common languages.[47] In Japan, as discussed earlier, employers can rely on schools to perform much of the screening functions. In the United States, however, the transplants had to recruit workers without the aid of schools. Many of them hired consultants to develop screening procedures.[48]

Perhaps because high school graduates are less likely to quit and be absent on the job (Weiss 1988) as well as more likely to succeed in entry-level basic training (Lynch 1989, 1992), most of the transplants prefer production workers to have a high school diploma or the equivalent.[49] They prefer young workers with non-automotive experiences, at least for production workers, because of their desire to train, rather than retrain, workers in their own ways of operating.[50] The common objective was summarized by one of the transplant managers: give us a stable and dependable person with a good heart, and we can make anything of him/ her. This objective contrasts with that of a typical American employer whose hiring decision hinges on an applicant's experience, skills, and accomplishments: can he weld?

Production level employees were given batteries of tests including the General Aptitude Test Battery (GATB), and tests to gauge one's ability to assemble and disassemble simple mechanisms and to perform such tasks cooperatively with others. Typically, an applicant had to go through a multi-phased assessment procedure (see Appendix B for Toyota's hiring procedure). At Subaru-Isuzu Automotive (SIA), the process required more than 25 hours.[51] Only about 12 out of every 100 applicants were successful and ended up being hired through this procedure, which included initial screening and the administration of the GATB tests, interviews, problem-solving and group discussion exercises, assembly exercise, and reference checks.[52] Successful applicants were then placed on 90-day probationary

appointments with pay during which they were observed and trained on the job. The attrition rate during the probationary period was about 3 percent. SIA has since been experiencing an absenteeism rate of only 3 percent.

High on the agenda of all transplants was employees' ability to work in a team. Individualistic applicants were turned down. At Mazda Motor Manufacturing, for example, 10 to 15 applicants were put in the same room to be tested on their ability to follow direction from worksheets and to help fellow workers who fell behind.[53] Very few of the production level workers were sent to Japan for training, but low level managers--team leaders, for example--hired after intensive interviewing--were sent to Japan. There, they received training in company philosophy, management style, and technical skills.

In addition to the building of a homogeneous workforce, the transplants shared another common experience: newly hired employees had to be trained from scratch in such elementary skills as how to tighten bolts, how to assemble a simple mechanism, etc. A Japanese manager at a transplant stated, "In Japan, it is not necessary to begin with the basic skills, but here there is no guarantee that the new employees have good basic skills." Toyota and Nissan, for example, were faced with a workforce which had especially low and varied technical capabilities.[54] These transplants worked with the states and community colleges to administer preemployment training in the general basic skills without pay or guarantee of employment. Most of the trainees ended up in the hiring pool, though not all were hired immediately. Training also took place before hiring at Diamond Star Motors and Subaru-Isuzu Automotive, but their trainees were paid during training period.

For technical training, some of the transplants used elaborate formal training up front: at Toyota, maintenance associates received about 2,000 hours of classroom and laboratory training before production started. At others like Honda, there initially were no formal training programs for technical skills. Instead, Honda concentrated on on-the-job learning of

technical skills and on instilling the "Honda spirit," team building, and communication skills. As Honda grew, it started to formalize the training procedure, but formalizing was done by Honda's American employees.

In addition to an initial assimilation training of new employees and the subsequent on-the-job training, both Honda and Toyota transplants offer a variety of formal training courses for individual development. These courses are offered at their training centers, located adjacent to the main plant. There, numerous training courses are offered in basic and advanced technical skills much like formal training courses in Japan (off-jt). An important point to note is that these transplants' formal training also include training in employment relations, a practice that differ from Japan, where such training is conducted informally. At HAM, for example, general raining and training in voluntary involvement together constituted a far larger proportion of total training hours (cf. Table 3).

Toyota originated the lean production and other manufacturing practices that are responsible for the success of Japanese products in the international markets. Equally significant is the seriousness with which Toyota has conducted its training, as exemplified by the celebrated *Toyota Kogyo Koto Gakuen* (Toyota Industrial High School), which it has operated since the early 1950's.[55] True to this tradition, Toyota's plant in Georgetown, Kentucky offers many training courses, ranging in length from one week in quality circle participation to 240 hours in basic machining course, designed for those with little or no previous formal machine shop experience.[56] Non-technical courses are designed for all team members, and skilled workers receive preference over others in admissions to technical courses. Advanced skilled trades courses--in machine structure (80 hours), hydraulics (80 hours), electrical equipment control (80 hours), etc.--are also offered to create multi-skilled maintenance workers. Enrollment in these classes is on a voluntary basis. For promotion courses, designed to prepare team members to become team leaders and group leaders, 800 out of about 1000 team members volunteered initially--50 dropped out later--but

nowadays enrollment is restricted to about 300 per year. Toyota's promotion pool consists of those who completed these courses.

At Honda of American Manufacturing, the oldest of the Japanese transplants, training courses are classified into general training, fundamental training, voluntary involvement training, technical training, and the recently introduced technical development program modules. Table 3 describes Honda's training programs. Courses range in length from 4 hours (torch training) to 40 hours (maintenance). Enrollment is voluntary.

It should be emphasized that these courses are meant to complement informal on-the-job training. Also, not all of the training contents and procedures were imported from the parent companies in Japan. Instead, each transplant developed its own methods.[57] For example, the Japanese emphasis on self-study is not practical with the American workforce, so it is not used at these transplants. Toyota's course on conflict resolution is nonexistent in Toyota in Japan. Also, Japanese manuals are said to be purposely vague and suggestive rather than detailed and literal, giving scope for thoughts, imaging, and individual comprehension. American trainees prefer asking: show me, give me the picture. As a result, training at the transplants makes extensive use of videos and pictures, rather than written materials, combined with a great deal of hands-on training.

V. Concluding Remarks

New employees in Japan receive life-long training not only in technical skills but also in skills needed to function as team member--sharing information and responsibilities among colleagues and teaching other, less experienced, workers. Although much of training takes place informally, Japanese workers receive periodic formal training (off-jt) to gain theoretical knowledge. Larger establishments are more likely to offer off-jt's and are more likely to conduct them within the firm. Smaller firms have relied on courses taught at vocational training schools and other

outside sources. In Japanese transplants, formal training includes training in employment relations as well as technical training (cf. Table 3).

A close coordination between schools and employers in Japan facilitates consistent flows of new, malleable, employees to firms. This way, the Japanese educational system ensures the availability of educated and trainable new workers to all industries, leaving the provision of industrial training up to the individual firms. The relative homogeneity in, and high levels of, academic achievements of new employees in Japan lower the costs of investing in both technical skills and employment relations. As a result, the Japanese workforce has become both cooperative and productive. The Japanese approach developed after World War II by combining the lessons from the United States with elements from Japan's own traditions and culture, and was consolidated and perfected against the background of the rapid economic growth starting in the late 1950's.

Clearly, employers in Japan and the U.S. face different constraints in hiring and training. It appears, for example, that American workers' high propensity to move and management's failure to build trust-based employment relations have made it difficult to implement a Japanese style long-term training approach in many U.S. firms. An executive at a Japanese transplant noted the short-term outlook of a typical American worker, "if an American worker is praised, he will ask for bonus or pay raise right away." Also, creating a homogeneous workforce in the U.S. is a costly undertaking, as evidenced by the elaborate hiring procedure used by the transplants. The diversity in the U.S. workforce has had its benefits, for example, in encouraging individual creativity and independent thinking. Nevertheless, by raising the costs of training investments, diversity must been a factor in discouraging investment in employment relationships. This consideration may explain why there has been a greater focus on technical training than on employment relations in the United States. Training programs at several major U.S. firms summarized in Lynch (1989), for example, are mostly directed at enhancing technical skills.

Japanese automobile transplants are still young in the United States, but it is possible to compare their training approaches with the approaches of their parent companies. In the total absence of Japanese style relationships between schools and industries, the transplants had to invest substantially in initial hiring. Such large initial investments are not necessary for employers in Japan. Because of the diversity in, and the low level, of the basic academic and technical skills of their new hires, these transplants must offer technical training that is much more circumscribed, and involving more elementary skills, than their parent companies do. At the same time, judging from the practices of Honda and Toyota, transplant employees receive extensive training in team building, communication skills, and other skills in employment relations (Table 3).

Many of transplants' managers are American, and their proportion is likely to grow. In most cases, American managers of the transplants report to their Japanese superiors. At the same time, given the relative flatness of organizations and the prevalence of consensus-based decision making in the transplants, they have less power than typical plant managers in traditional U.S. owned plants. Thus, some transplant managers may feel squeezed from above and below. In my interviews, I found many American managers were enthusiastic with their job and predicted that they would still be with the transplants in five years time, but some weren't so sure. Indeed, some managers quit working for transplants after only a few years to take up positions in U.S. owned manufacturing plants (Fucini and Fucini, 1990). Through such selection process and training, transplants are likely to end up with a different kind of managers than the traditional automobile plant managers.

In talking to both Japanese and American managers, I discovered that American managers' understanding of Japanese practices is still developing. Japanese and American managers both discussed in equal depth the role of self-study in Japanese training, the just-in-time inventory (*kanban*) system, and the *kaizen* practice.[58] However, on team-based production, sharing of

information and responsibility, and job rotation, American manager' discussions tended to focus on technical aspect. Few of them mentioned the subtle nuances of these practices that Japanese managers talked about. On team-based activities, for example, American managers tended to give a mechanical description--team size and teams' functions, for example--without stressing the point that if a team member should encounter difficulties, all relevant members within his team, and even members of other teams, willingly share the relevant information to solve the problem. Job rotation is another example. American managers talked about rotating workers within teams every two hours, for example, without noting the more important aspect, which is the life-long learning through job rotation.

The principal features of Japanese training that have been instrumental in shaping Japan's highly productive labor force are: reliance on self-study for technical training, senior workers' training of junior workers, sharing of information and responsibilities, life-long training by job rotation, and an occasional infusion of formal training throughout an employee's tenure. Can these practices be sustained with the American labor force? The experiences of the Japanese transplants do suggest that some of these practices will be adapted. The answer depends in part on how well American workers, and especially managers, become trained in what these Japanese practices are really about.

Popular discussions suggest that the answer also hinges on employers' abilities to credibly foster job security and on employee commitment to long-term career development within firms. But what do job security and long-term career development mean, and how can they be developed? According to my theory, job security and long-term commitment aren't synonymous with a "lifetime" employment adhered to regardless of changing conditions. Rather, they refer to an arrangement in which inefficient separations are reduced to a minimum but efficient separations take place without fail.

It may be tempting to blame the employment-at-will doctrine, which gives employers and employees the right to separate unilaterally, as being responsible for the apparent lack of job security in U.S. labor markets. It should be remembered that this doctrine underpins Japanese labor markets as well, the celebrated lifetime employment notwithstanding. According to my theory, the employment-at-will doctrine guarantees that a separation, if it is efficient, will always take place. Since this doctrine is an inherent feature of the American labor market, the important task becomes one of reducing inefficient separations. And for that purpose, investment in employment relations is the proper prescription. The peer review system such as those at Honda and Toyota is a concrete example of an institutional framework that exemplifies such investment.

Finally, to promote an understanding of training issues, future efforts at data collection should address the distinction between technical training and training in employment relations. In particular, to ignore training in employment relation is to miss an increasingly important component of training, as more and more western employers adopt elements of Japanese operating style and philosophies. In Japan, the fact that most training occurs informally makes a comprehensive data collection difficult. Fortunately, in the United States training tends to be formalized, as is evident even with the Japanese transplants, so the data collection may be less difficult there than in Japan.

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ENDNOTES

1. The information contained in this paper was gathered during interviews of management level personnel at Subaru-Isuzu Automotive Inc. (SIA), Diamond-Star Motors, Mazda Motor Manufacturing (USA), Toyota Motor Manufacturing, USA, Honda Motor Company, Japan, and Honda of America Manufacturing. I wish to thank these companies and their employees--too numerous to mention in this space--for agreeing to participate in my study. Helpful comments were received from seminar and conference participants at the Institute of Social and Economic Research (Osaka University), Kyoto Institute of Economic Research (Kyoto University), Japan Institute of Labor, Western Economic Association International Meeting. I am grateful for the useful comments offered by the participants in these sessions. Helpful comments were offered also by Barbara Brugman, Walter Oi, and Mari Sako. John Bishop, Yoshio Higuchi, Machiko Osawa, and the Japan Institute of Labor kindly provided me with relevant information. This study was financed in part by the Center for Labor Research at the Ohio State University.

2. The focus on the automobile industry is meaningful, since in recent years about two-thirds of U.S. trade deficits with Japan have been attributed to automobile imports. Also, many aspects of Japanese manufacturing methods, i.e., "lean production," developed in this industry, and in particular at Toyota.

3. The defect figures are from the J.D. Power Initial Quality Survey as reported in Womack *et. al.* (1990, Figure 4.4), and refer to defects traceable to the assembly plant, as reported by owners in the first three months of use.

4. Assembly hours ranged from 13.2 in the best plant in Japan to 25.9 in the worst plant. For Japanese transplants in North America, comparable figures were 18.8 and 25.5, respectively, and for U.S. owned plants in North America, 18.6 and 30.7, respectively. See Womack *et. al.* (1990, Figures 4.3 and 4.40.

5. The same MIT study shows that U.S. owned plants in North America on average required fewer hours to assemble a car than plants in Europe or in newly developing countries. Defects were slightly fewer in plants in those countries than in U.S. plants, though more than in Japanese transplants.

6. See also MacDuffie and Kochan (1991) for a related discussion on training in automobile industries.

7. The main conclusion of the MIT project is that lean production, a term coined by one of the project's investigators, is preferable to mass production (Womack *et. al.*, 1990). Most Japanese automobile, as well as other, manufacturers are said to practice lean production. The just-in-time inventory (*kanban*) system, team-based production, the *kaizen* (continuous incremental improvements) practice, quality control circles, and active worker participation--e.g., any worker who detects problems can stop the assembly process by pulling a cord---are some of the key features associated with lean production. According to the MIT study, the lean production method realizes the benefits of mass production (low unit cost) and the traditional craft production (quality), because it "transfers the maximum number of tasks and responsibilities to those workers actually adding value to the car on the line, and it has in place a system for detecting defects that quickly traces every problem, once discovered, to its ultimate source...mass production is designed with buffers everywhere--extra inventory, extra space, extra workers--in order to make it function....in old-fashioned mass-production plants, managers jealously guard information

about conditions in the plant, thinking this knowledge is the key to their power..." (Womack *et. al.*, p. 99 and p. 103). This last point is pertinent to this study as my theory in section II treats reliable information exchange as the basis for productive employment relations.

8. My focus in this paper is employment-based training in private sector firms. Dore and Sako (1989) offers comprehensive discussions on the Japanese school system, vocational and technical training, as well as on-the-job training.

9. This conceptual framework is adopted from my recently formulated theory of employment relations in Japan (Hashimoto 1990b, c), which is an extension of my earlier work (Hashimoto 1981, Hashimoto and Yu 1980).

10. Bishop (1990) finds that competence in science, language, arts, and higher level mathematics indeed is associated with success in training and high performance in hands-on work sample tests. See section III for a discussion on the relationship between schools and employers in Japan.

11. See Section III for a discussion on self studying in Japan. Also, the time saved can be directed to training in employment relations.

12. Mathematical expressions for M^*, M_1, and M_2, as well as other magnitudes of the model are available upon request.

13. In this model, I assume that only the employer knows the true inside productivity and only the employee knows the true alternative productivity.

14. An interesting new result of my model is that if the variance of the inside productivity increases relative to the variance of the alternative productivity, the optimum worker share is increased. The intuition behind this result hinges on the fact that in this case the probability of efficient dismissals increases. As a result, the parties are better off by increasing the worker's share in order to let it do more of the work, as it were, of reducing inefficient quits.

15. Inefficient separations take place when parties separate even though the quasi rent is positive.

16. If s is zero, $\hat{M}$ equals M_2, which in turn equals M^*.

17. If a rigid contract were chosen, s would not affect $\hat{M}$, and so the optimum h would be independent of it.

18. The threshold variance, $\hat{s}$, is assumed to be less than $\bar{s}$. If $\bar{s} < \hat{s}$, then the flexible contract will dominate always.

19. Large Japanese investments in -s are indicated by such time-consuming measures as joint consultations and the consensus-based decision making (*nemawashi*). According to several American managers of Japanese automobile transplants in the U.S. Midwest, the time consuming process of consensus building is one of the major adjustments that Americans have to accept to work in the "Japanese-style" work environment.

20. Tachibanaki (1987) contains a useful comparison of labor market flexibility in Japan, the United States, and Europe. See also Hashimoto (1990b).

21. Such Japanese practices as joint consultations, consensus-based decision making, and enterprise unionism became widespread only after the late 1950's (Hashimoto 1990b).

22. An extensive treatment on the history of this campaign appears in Nihon Seisansei Hombu (1988). See also Nihon Sangyo Kunren Kyokai (1971).

23. The campaign included conferences and seminars in which top level industrialists, bankers, scholars, and bureaucrats participated, numerous visits by Japanese managers and unionists to the United States and Europe as well as visits by Western specialists to Japan, and active information dissemination. Between 1955 and 1956, for example, forty-two missions involving 481 members were sent to observe various U.S. industries. See Japan Productivity Center (1988, Chapter. 4). Another organization, Nihon Sangyo Kunren Kyokai (Japan Industrial Training Association) was established in 1955. It was responsible for introducing the case study method of Harvard Business School to Japan in the mid-1950's.

24. The characteristics discussed here are more visible among large firms. Large firm practices tend to serve as the benchmark for small and medium sized firms in Japan, however. Since most of the executives at Japanese transplants have been with their parent companies in Japan for over ten years, they were well informed about employment and training practices at various Japanese companies. They could also offer their first hand evaluations of how Japanese approaches may work with the U.S. labor force.

25. I hasten to add that vocational and technical schools do exist in Japan. See Dore and Sako (1989) for a informative discussion on Japanese schools, and Levine and Kawada (1980) for an informative discussion on the role of industrial training in Japanese economic development.

26. The homogeneity argument may be appreciated with my model in the following manner: with worker heterogeneity in $\tilde{s}$ and in w and l functions employers would have to devise a separate contract for each employee or adopt standardized contracts, which would be suboptimal for any given employee. An American manager at a Japanese automobile transplant observed, "managers in Japan share a common background with their employees so that they, the managers, just have to point to the right direction and things get done. In America, managers have to do more to get the job done." A Japanese manager at another Japanese automobile transplant recalled that even the difference in the physical size among American workers posed a challenge in installing machinery in such a way to minimize physical strains. In Japan, where the distribution of body size is compact, a given setting of machines tends to be appropriate to a large number of workers.

27. For example, a recent international comparison of science achievement found the following: in a sample of young teenagers (mean age of 14.7 in Japan and 15.4 in the U.S.), the mean science score (the coefficient of variation in parentheses) was 20.2 (24.8%) for Japan and 16.5 (30.3%) for the United States. In the tabulations for other age groups as well as for separate scores for biology, chemistry, and physics, the Japan-U.S. differences in the mean and the coefficient of variation persist. See International Association for the Evaluation of Educational Achievement (1988). Bishop (1990) summarizes international comparisons of test scores in science and mathematics.

28. As Dore and Sako (1989) put it, the Japanese basic education "produces people capable of following carefully detailed and complex written instructions...This means that a lot of learning is based on informal production of job specifications and procedure manuals meticulously written out by supervisors and used as teaching material for self-teaching by

newcomers to a job. You do not just stand by Nelly; you read what Nelly has thoughtfully and meticulously written about what she knows." (p. 80).

29. A Ford pamphlet told workers about the importance of taking baths, living in clean, airy, well-lighted, and uncrowded surroundings, and saving to buy one's own house. Excessive drinking, gambling, untidiness, consumption of unwholesome foods, and lack of enthusiasm for saving money regularly were all potential grounds for exclusion from the program (Raff and Summers 1987, pp. S70-S71). According to Raff (1988, p. 399), "The Ford Motor Company, through its famous Sociological Department, was at a considerable pains to tell its employees how to think about its beneficence."

30. One possible reason for this phenomena is that American school grades are not uniform in quality from school to school. In effect, grades contain too much "noise" to be useful to an employer. Since the Japanese education system is governed by the Ministry of Education, the contents of courses in Japan are much more uniform among schools than in the United States. As a result, course grades are more informative in Japan.

31. A management level employee at Honda in Suzuka, Japan told me that Honda does in fact have such arrangements with several high schools. However, it also sends out recruiting brochures to other schools as well. Rosenbaum and Kariya (1989) reports that in an area near Tokyo a typical high school had semiformal arrangements with about 77 employers, which is only a little over 11 percent of all employers who send job offer forms to this school. However, these 11 percent of firms hired almost half of all the work-bound graduates from each school.

32. This practice has an "experience rated" feature. Employers assign different size quotas to schools depending on their previous experiences with the school (Rosenbaum and Kariya, 1989).

33. The emphasis on safety is ubiquitous in Japanese firms and transplants, perhaps underscoring the desire to protect investments in human capital.

34. It would appear, therefore, that the usual measure of training investments in terms of time spent on the job understates the total training resources devoted to the formation of on-the-job human capital in Japan. The self-study phenomenon in Japan implies that total resources that firms devote to employment relations relative to technical training are greater in Japanese than in American firms. This implication, in turn, may bear on the more cooperative industrial relations that have existed in Japanese firms than those in the United States.

35. Koike (1990) discusses a related practice where a worker writes reports on troubles he encounters on the shop floor, and on how he has dealt with them, to be discussed in workshop meetings later.

36. It is said that a typical salary-man returns home about 11:30 p.m. almost every evening. Usually, there is no overtime pay for these activities. See Valigra (1990) for an account of a typical day in the life of a Japanese worker of management rank.

37. Koike (1990) stresses the role of hierarchical teaching in the job rotation system. According to this system, a veteran worker stays close to a new worker instructing the young worker.

38. The relation between job security and the incentive to provide training has been known. Parsons (1990) reminds us that early apprenticeship contracts addressed this problem by restricting the apprentice's right to compete with the master by specifying, for example, that the apprentice could not operate within a certain range of the master's own shop. I hasten to remind the reader of my argument that job security should not prevent inefficient separations from taking place (cf p. and the concluding section).

39. Many of the transplants judge the promotability of their employees on the basis of criteria that include the employees' ability to teach others.

40. Job instruction, job methods (methods for improvement), and job relations (interpersonal relations) were the three components of the *training within industry* (TWI) concept developed in the U.S. during the war years to rapidly produce skilled workforce. The TWI concept is synonymous with on-the-job training. The GHQ's guidance was patterned on the U.S. War Manpower Commission, which developed a comprehensive training approach based on TWI. The Commission is said to have trained about 2,000,000 supervisors during the war years. Japan also learned from the U.S. how to conduct management training, quality control, and interpersonal relations during these years. An important point, however, is that the GHQ provided only manuals, and that the Japanese had to interpret them and develop their own approach (Nihon Sangyo Kunren Kyokai 1971).

41. See, for example, Womack et. al. (1990, Chapter 5).

42. A Japanese manager at a transplant told me of his recent experience. His American subordinate failed to complete an assignment one day. He asked the worker why he did not seek advice and information from Mr. X in another department. The worker gave several excuses, which could be summed up as

"you didn't tell me to." A corollary of this experience, according to this manager, is that an American workers performs superbly on a task that is well defined and delineated.

43. A similar point was made by Koike (1984) and Aoki (1988). Aoki notes that "the multifunctionality of workers fostered by a wide range of job experience (and job rotation in particular) may enable each shop to adjust job assignments flexibly in response to the requirements of the downstream operation...Further, workers trained in a wide range of skills can better understand why more defective products are being produced and how to cope with the situation as well as prevent it from recurring." (pp. 36-37).

44. These magnitudes are from Japan Ministry of Labor (Shokugyo Kunren Kyoku), Minkan Kyoiku Kunren Jittai Chosa Hokoku Sho (Report on the Survey of Private Sector Training), 1990.

45. This assumption is plausible, since in Japan formal training (off-jt) is a complement to informal training: as discussed earlier, formal training is designed to offer systematic and theoretical knowledge relating to what workers experience on the shop floor.

46. Although this table refers to 1988, tabulations for other years indicate similar patterns.

47. In other words, the environment box in Figure 1 was made endogenous to some extent. The heterogeneity consideration appears to have played a role in the location decision. For example, the decision by many of the transplants to locate in rural Midwest areas is said to have been influenced by the availability of the German-American workforce with strong work ethics (Gelsanliter, 1990). It is worth recalling that Honda of American Manufacturing was sued for having given hiring preference to workers from

the Marysville, Ohio area to the exclusion of the more racially mixed labor pool available in nearby Columbus. The firm settled out of court in 1988 and paid $6 million to about 370 black and female workers. Since then, Honda has extended its hiring area to include Columbus, and now uses a computer to randomize applicants before selecting new hires, according to one of its managers. See Higuchi (1987) and Shimada (1988) for related discussions on the Japanese transplants, and Business Week (October 3, 1989) for screening practices at Mazda Motor Manufacturing and the Diamond-Star Motors.

48. These consultants themselves went to Japan to observe Japanese practices and developed their recommendations for screening procedures.

49. Some transplants do not explicitly require a high school diploma, however. Lynch (1989a) found that, in the U.S. National Longitudinal Survey of Youth, having a high school diploma raises the probability of receiving an apprenticeship training or off-the-job training, i.e., being sent to business colleges, barber or beauty school, or nurses programs. However, she found little evidence of complementarity between schooling and on-the-job training.

50. Many skilled workers--machine maintenance, die handlers, welders, for example--came from small manufacturing shops and, occasionally, from automobile related industries. Many of the management level employees also have non-automotive manufacturing experiences. Typically, only 5 to 8 percent of all employees have previous automotive experience, and the average age of the workforce hovers around 35 years of age. It is reported that the transplants chose the rural Midwest because of ethnic homogeneity--German Americans, for example--and that they wanted to avoid hiring those with union background (e.g., Fucini and Fucini 1990, Geslanliter 1990, and

Shook 1988). Those I interviewed stressed the Midwest work ethic and diligence as being the most important reasons in their location decision.

51. See Woroniecki and Wellins (1990) for a compact but informative discussion of their hiring procedure.

52. This procedure was developed by an American consulting firm together with the parent companies for SIA. The staff from the consulting company was sent to Japan to observe the parent companies. More than 50 state and SIA associates spent four days receiving training on how to make accurate selection decisions. The State of Indiana assisted SIA by screening and administering the GATB tests. The State also provided physical facilities and staff to conduct subsequent assessment exercises.

53. Shimada (1988) contains similar accounts regarding Honda's hiring practices.

54. Nissan declined to be interviewed. My information on Nissan is based on my interviews at the other transplants.

55. Training at the high school includes both on-the-job training and formal courses. Graduates from the school receive an equivalent of high school diploma. For a useful discussion on Toyota's high school, see Sumiya *et. al.* (1978, pp. 220-228).

56. Toyota claims to be working towards achieving a pace for training which would allow team members to complete their required core courses by mid-1993. This pace translates roughly to a rate of training of 50 hours per year for team leader and above, or 2.5 percent of work hours each year. See Toyota's TMM Training & Development Catalog (January-December, 1990). A Toyota spokesman reported that between January and June, 1991, 569 employees

completed skilled trade courses, and 2,620 employees completed employee development courses.

57. In fact, formal training programs have been rare in Japan. As will be discussed in the next section, there have been a growing interest in introducing formal training programs in Japan.

58. The term *kaizen* refers to making small incremental improvements continuously rather than occasional large improvements.

APPENDIX A

PROFILES OF SELECTED JAPANESE AUTOMOBILE MANUFACTURERS

The following brief profiles pertain to the automobile manufacturers I visited, and are based on the information I gathered by interviewing their management personnel and on published sources. Conspicuously missing is Nissan, which rejected my repeated requests for visit. Some common features of the Japanese automobile transplants are as follows:

(1) These plants are not a mere "screwdriver operation", where parts imported from Japan are assembled into automobiles. On the contrary, these plants all contain a stamping shop, a plastic molding shop, a body shop, a paint shop, and a trim and final assembly area.

(2) The transplants constantly remind the employees that the company is made of its people--employees of all ranks are referred to as either associates or team members, and wear uniforms, which are required in some plants and "encouraged" in others. Employees of all ranks eat in the same cafeteria, and park their cars in the same parking lots. All have open floor layout for offices, though some have low partitions.

(3) Production tasks at the transplants are performed in teams. A typical team consists of 7 to 10 team members, and is responsible for a part of the manufacturing process. A typical transplant has over 150 teams on a typical day. Team leaders are selected during the assessment process, and many of them have been sent to Japan for brief training. Team leaders are paid 5 to 8 percent more than ordinary team members. Typically, a group of several teams are supervised by a group leader.

(4) Much emphasis is placed on the importance of working as a team, nurturing trust through open communication, of building quality into the product and striving for constant improvement (*kaizen*). As noted earlier, the term *kaizen* refers to introducing small incremental improvements continuously rather than making occasional large improvements. All the transplants have various types of employee participation programs including quality control circles, suggestion systems, improvement programs, etc.

(5) All the transplants use the just-in-time inventory (*kanban*) system. Since parts suppliers are located farther away from the main plants

here than in Japan, the level of parts inventories is higher here. Honda of America Manufacturing, for example, typically has one day supply of parts, but its Japanese parent has only a few hours supply. Toyota Motor Manufacturing, U.S.A., carries a thirty-day inventory of steel, but seats are manufactured and delivered by a nearby supplier in the morning for installation in early afternoon.

(6) Management consists of some Americans and some Japanese (except in Nissan, whose management is 100 percent American). Workers on the shop floor are almost all American with Japanese serving only as advisors, sometimes called facilitators. Unlike in Japan, females workers are well represented on assembly lines.

(7) All transplants stress the importance of job security, though none "guarantees" there will be no layoffs;

(8) Production level employees are paid hourly wages. (Their counterparts in Japan are on salaries.) These employees start with wages that are lower than their counterparts at Big Three, but when the attendance bonus and other payments are included, their wages compare well to the Big Three. In all transplants studied, wages increase in a series of steps. Honda of America Manufacturing (HAM) near Columbus Ohio has one of the more elaborate compensation schemes, perhaps because it has been in operation for the longest period of time among all Midwest automobile transplants. The starting base hourly wage rate was $12.00 in September 1990, which would increase in six steps until it reached $14.75 in 18 months. In addition, pay could be augmented by an attendance bonus and profit sharing. HAM's profit sharing is based on Honda's profits worldwide rather than on American operations alone. An associate with three years of tenure and perfect attendance would earn a total hourly wage of $16.52 ($14.75 in base wage, $0.95 in attendance bonus and $0.82 in bonus sharing), according to HAM's brochure, Wages and Benefits (Appendix C). In addition to wages and bonuses, HAM employees receive various insurance and assistance programs including shares of stocks in Honda Motor Co, stock purchase program, and educational assistance. The newer transplants, such as Subaru-Isuzu Automotive, and Diamond Star Motors, were still in the planning stages of introducing elaborate compensation programs as of summer 1990.

(9) With the exception of Mazda, all are located in rural areas, and their workforce is young and with little previous automotive experience.

(10) Except for Diamond-Star and Mazda, the workforce at these transplants is not unionized. Diamond-Star and Mazda are both organized by the UAW, but are not covered by the national agreements like the one applying to the Big Three. Their agreements contain more flexibility in job assignment, less job demarcations, and less worker categories than a typical UAW contracts. Both have no-strike contracts.

[Diamond-Star Motors (DSM): Normal, Illinois]

Diamond-Star Motors started production of Plymouth Laser and Mitsubishi Eclipse in June, 1988 as a 50-50 joint venture between Mitsubishi Motors and Chrysler. This plant is said to be the world's most technologically advanced plant with more than 470 robots in operation (Business Week, August 1989). It consists of a 2,000,000-square-foot building and a 1.5 mile oval test track. At full capacity, the plant can produce 240,000 vehicles per year. In October 1991, Mitsubishi acquired full ownership in Diamond-Star by buying Chrysler's 50% share (Wall Street Journal, October 30, 1991).

As of August, 1990, there were about 3,000 employees, called associates, of which 21 percent were females. Minorities constituted 11 percent. There also were about 60 Japanese employees, of which 25 were at the management level. The section chief is Japanese, but direct supervision is done by an American. About 35 percent of the workforce has manufacturing experience, but only 5 percent has automotive experience. Before joining DSM, many of the workforce were farmers, and employees at fast-food restaurants and at small manufacturing establishments. Turnover has been about 4 percent. Most discharges have been due to absenteeism. About a third of those quitting were recalled by Caterpillar, found new jobs, or were tied movers with their spouses.

The plant has been organized by the UAW since its inception. DSM and the union hold periodic meetings at the company level and section level within the bargaining unit to share information regarding the operations.

[Honda of America Manufacturing (HAM), Inc.: Marysville, Ohio]

This operation is the oldest, and therefore the most experienced and the most informative, of all the Japanese automobile transplants in the United States. It started its U.S. production of motorcycles in September

1979. The production of the Honda Accord began in November, 1982 at its new 1,000,000 square feet plant built next to the motorcycle plant. In 1986, the automobile plant was expanded to 3,100,000 square feet of space with production capacity reaching 360,000 cars per year. Subsequently, the Anna Engine Plant (Anna, Ohio) was added in 1987, and the East Liberty Plant (East Liberty, Ohio) started production near the Transportation Research Center (1989), which it bought from the state of Ohio, making the total production capacity approach over 500,000 cars per year. With the Anna engine plant producing engines and drive trains, the domestic content of Ohio produced Hondas is said to reach over 70 percent. The Accord Coupe and Station Wagon were designed in the United States and produced exclusively at HAM's plant in Ohio. HAM now exports to Canada, Israel, South Korea, Mexico, and Taiwan as well as to Japan.

As of November, 1990, HAM had 5,200 employees, called associates, at Marysville Plant, of which 33 percent were females, and a little over 10 percent were minority. The Anna Engine Plant had about 1,500 associates, and the East Liberty Plant had about 1,800 associates. Many of these employees came from backgrounds such as hair dresser, grocery clerk, high school teacher, and farmer. The number with previous automotive experience is very small. Honda's production associates are said to have earned about $40,000 in 1989 including overtime, which income is higher no doubt than what most of them had earned previously. Appendix C contains information on HAM's wages and benefits.

The Associate Development Center adjacent to the main plant contains seven classrooms (20 person capacity per room), a computer room, a graphics room, an auditorium (198 person capacity), Honda Hall (300 person capacity), laboratories, and a technical information room. Training classes are given in such technical subjects as welding, hydraulics, and robotics, as well as in Japanese and English languages and stress management. The Center runs Honda's Voluntary Improvement Programs, which includes a suggestions system, quality control programs, quality and safety award programs. In September, 1990, there were over 350 such activities in progress. Under the award programs, an associate is given points for making useful suggestions, contributing to quality improvements, or spotting defects. The computer tabulates points, and the results are posted for everyone to see. The grand prize is a Honda Civics, six of which had been given away to winners as of

August, 1990. The Center's various programs appear to have provided inspiration to other transplants: Honda's practices came up in a few of my interviews with employees of other transplants.

One of the unique features at HAM is the *Associate Review Panel* system, by which a discharged employee can appeal the discharge decision. The Panel's primary function is to decide if the discharge decision was made properly rather than to serve as a grievance procedure. Unlike the usual case, the Panel becomes operational after an employee is discharged. A discharged employee may request a panel review within three days of discharge. Six non-supervisory panelists are then chosen randomly from a tumbler. At the hearing, a mediator, the discharged associate, Associate Relations presenter, and one senior manager are present in addition to the six voting panelists. The discharged employee represents him/herself, and the hearing consists only of questions and answers, and no statements can be made. At the end of the hearing, only the six panelists remain in the room, and the decision is made by secret votes. So far, there have been about 18 to 20 review panels per year, which is equivalent to about 30 percent of terminated employees requesting such panel. About 20 percent of those who asked for a review have been reemployed. This system was implemented in 1985 at HAM, and no similar system exists at Honda's Japanese plants.

[Honda Motors-Suzuka Plant, Suzuka, Japan]

This plant is one of Honda's five plants in Japan. It was built as Honda's third full scale plant in 1960 to manufacturer motorcycles and automobiles. As of February, 1990, this plant employed 10,967 associates. Line 3 at this plant has the latest technology, and served as the prototype for the East Liberty Plant in Ohio. On the day I visited, I saw no female workers on the assembly line, and male workers looked very young (younger than 25 years of age). Unlike their counterparts in the U.S., all associates are salaried employees. The majority of the associates have high school or junior college background.

There is a training center in a separate building, but it consisted of meeting rooms and halls. There was no evidence of specialized training as in the Associated Development Center at Ham. Very few people were in the center. Overall, the center struck me as rather stark in comparison to its counterpart at HAM. Perhaps this atmosphere reflects the tendency for

Japanese training to take place on the job in combination with self-study rather than in classrooms. There also is a voluntary improvement program, much like at HAM.

[Mazda Motor Manufacturing (USA) Corp.: Flat Rock, Michigan]

This plant, occupying 2,700,000 square feet of space, is 25 percent owned by Ford. It started production of a Mazda model in September, 1987 and a Ford model in January, 1988. It can produce 240,000 cars per year at full capacity. A collective agreement was signed with the UAW in in March, 1988. Mazda won a long-term commitment from UAW to the principles of flexibility, efficiency, and implementation of work practices and production systems like the ones used by Mazda in Japan (Fucini and Fucini, 1990, p.170). Mazda, in turn, promised the UAW not to lay off employees, except for financial exigencies, and to provide meaningful employee involvement programs.

Employees at Mazda are referred to as team members. In September, 1990, there were 500 non-union Americans, 2,850 unionized Americans, and 150 Japanese team members. Japanese workers mostly serve as advisors since they cannot work on the assembly line, according to the agreement with the UAW. Almost 30 percent of all workers are females, and minorities constituted a little less than 19 percent.

Mazda has kept a *Support Member Pool*, a pool of original applicants who were not hired initially as regular employees. Pool members are hired on a temporary basis to meet increased labor demand. They receive the same wage rate as regular team members, but much less in benefits, and they do not receive credit towards seniority. According to the agreement with the UAW, if Mazda should use the same pool member for more than 3 months, it would have to hire that person as a regular team member. In September, 1990, there were about 300 members in the pool, and Mazda was using them at the rate of 50 or fewer at a time. Mazda had hired about 75 pool members as regular team members.

[Subaru-Isuzu Automotive (SIA), Inc.: Lafayette, Indiana]

This joint-venture plant (51 percent Fuji Heavy Industries, 49 percent Isuzu Motors) started production in September, 1989. The plant occupies 2,300,000 square feet of space with the capacity to produce 12,000

cars per month. It produces Subaru passenger cars and Isuzu light trucks and sports utility vehicles.

As of July, 1990, SIA had 1,727 American associates, 125 regular employees from Japan and another group of 108 or so helpers from Japan. The workforce was about 24 percent female and about 5 percent blacks. Only a small proportion of the workforce (about 8 percent) has previous automotive experience. As of July, 1990, about 20 people had quit to take their former jobs or for other personal reasons, and 5 people had been dismissed for reasons of absenteeism or falsification of applications. The mean age of the work force was about 34 years. SIA is only about 65 percent robotized in order to promote employment creation in Indiana by agreement with the state.

[Toyota Motor Manufacturing, U.S.A., Inc. (TMM): Georgetown, Kentucky]

Production of Camrys began in July, 1988 at this plant, which occupies 4.45 million square feet of space. It is said that this plant is a clone of its plant in Japan, and it has relatively few robots (Business Week, August 1989). In late 1990, it announced its plan to add another plant nearby with a capacity to produce 200,000 Camrys (Business Week, December 10, 1990). It exports Camrys to Taiwan and Japan. Toyota's training center takes up 48,000 square feet of space, and contains some ten classrooms and a high bay area.

As of early 1990, the plant employed 3,123 team members, of which 25 percent were females and a little less than 13 percent were minorities. The plant had experienced a turnover rate of about 5 percent. Most were hired from Kentucky and had little automotive experience. The Team Member Handbook (February, 1988, pp. 102-103) states that lifetime employment is Toyota's goal, but that the "employment at will" arrangement governs all employment relations.

Toyota has had an elaborate system for reviewing discharge cases since late 1987. The review is carried out by the *Peer Investigation Committee*. Unlike Honda's *Associate Review Panel*, Toyota's process takes place prior to discharge. The Committee consists of six team members with voting rights and is chaired by the non-voting Employee Relations Managers. The selection of committee membership is by the length of service at TMM. When an employee's behavior and performance warrant possible termination,

the Employee Relations Manager reviews the facts in the case. Should he decide that termination is called for, the employee in question is notified of the pending action by his team leader. The employee then is sent home until the committee meeting is arranged. He receives pay for the time they are away from work unless he is later terminated. The employee in question has the opportunity to make a statement to the Committee. The Committee's recommendation is based on secret ballot. Regardless of the Committee's recommendation, the final decision is up to the General Manager-Human Resources and the General Manager of the respective area. As of June, 1991, 30 employees have gone through this process, of which 14 were reinstated. Toyota's peer review system did not come from Japan. Rather, it was patterned after similar systems used in U.S. companies.

Appendix B
Hiring at Toyota

HIRING PROCESS FOR TEAM MEMBERS

Toyota Motor Manufacturing, U.S.A., Inc. has developed a hiring process to build a team that will have the ability and commitment to produce America's number one quality automobile. The process has been designed to give candidates the maximum opportunity to demonstrate the full range of their skills.

Since it was announced in 1985 that Toyota would build an automobile manufacturing plant, the Kentucky Department for Employment Services has recorded inquiries from over 200,000 people.

First shift hiring was completed in December 1988. Hiring for the second shift was completed in May 1989. We will reach employment of approximately 3500 people when the engine and axle facility is in full operation in 1991. When fully staffed, the annual payroll will be in excess of $100 million.

Group Leaders and Team Leaders are promoted from within. Outside applicants are typically not considered for these positions.

Objectives

* Accuracy. Selecting the most qualified candidates is top priority. Candidates are selected for their potential to perform, their desire and ability to learn, and their interpersonal skills.

* Residential commitment. A preference is given to Kentucky residents.

* Fairness. Every candidate must have maximum and equal opportunities to demonstrate their skills to assure selection based on relevant criteria.

* Efficiency. The hiring process has to be efficient to effectively process the large number of applicants.

* Applicant convenience. Applicants are processed through the 27 Kentucky Employment Services Offices located throughout the state.

The Process

Phase I Orientation/Application

Fill out an application and view a video of the Toyota work environment and selection system process (1 hour)

Objective:	To explain the job and collect information about work experiences and skills.
Conducted:	Kentucky Department of Employment Services

Phase II Technical Skills Assessment

Pencil/Paper tests

* General knowledge test (2 hours)
* Tool & Die or general maintenance test (6 hours)*

Objective:	To assess technical knowledge and potential.
Conducted:	Kentucky Department of Employment Services

Phase III Interpersonal Skills Assessment

* Group and individual problem-solving activities (4 hours)
* Production assembly simulation (5 hours)**

Objective:	To assess interpersonal and decision-making skills.
Conducted:	Toyota Motor Manufacturing

Phase IV Toyota Assessment

Group interview and evaluation (1 hour)

Objective:	To discuss achievements and accomplishments
Conducted:	Toyota Motor Manufacturing

Phase V Health Assessment

Physical exam and drug/alcohol tests (2-1/2 hours)

Objective:	To determine physical fitness.
Conducted:	Scott County General Hospital and University of Kentucky Medical Center

Phase VI On-The-Job Observation

Observation and coaching on the job after being hired (6 months)

Objective:	To assess job performance and develop skills.
Conducted:	Toyota Motor Manufacturing

*Skilled Trades Only
**Production Only

OUR TOTAL COMPENSATION AT ONDA OF AMERICA MANUFACTURING

ase Hourly Wage—This is the regular hourly wage received by all oduction, maintenance and office clerical associates, exclusive of shift emiums and overtime.

ttendance Bonus—This bonus is paid for perfect attendance for all gularly scheduled hours during any consecutive four week period. To be gible, associates must also clock in and clock out according to company olicy. Eligible associates can now earn up to $1,976 per year in Attendance onus payments.

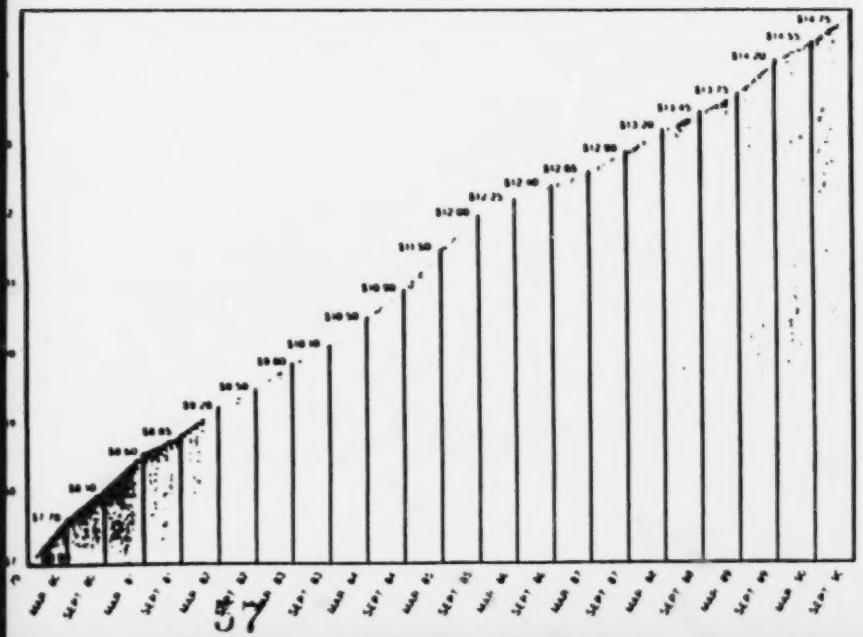
AM Bonus Sharing—The HAM Bonus Sharing Program rewards ssociates for their continuing productivity and efficiency with a bonus based pon Honda's worldwide corporate income. Bonus Sharing amounts will vary om year to year depending in part on Honda earnings worldwide.

RODUCTION WAGE INCREASE AS OF SEPTEMBER 6, 1990

0¢ an hour increase in base hourly wage for production associates with 15 onths or more at HAM. Production associates with 3 months to 12 months ervice will receive 10¢ to 15¢ an hour increase in base hourly wage.

ISTORY OF PRODUCTION WAGES AT HAM

ata represents base hourly wage for production associates after 18 months.



PRODUCTION WAGES EFFECTIVE SEPTEMBER 6, 1990

Start	3 Months	6 Months	9 Months	12 Months	15 Months	18 Months
$12.00	$12.70	$13.15	$13.65	$14.10	$14.45	$14.75

INCREASE IN ATTENDANCE BONUS

The HAM Attendance Bonus program recognizes the importance of perfect attendance. The Attendance Bonus is paid every four weeks to all full-time associates eligible to receive overtime pay who establish a record of perfect attendance and Bonus Week qualification for all regularly scheduled hours.

	4 Week Period		Annually	
	Sept. 6	Previous	Sept. 6	Previous
Less than one year	$112	$108	$1,456	$1,404
More than one year	$120	$116	$1,560	$1,508
*More than one year and 52 consecutive Bonus Weeks	$144	$132	$1,872	$1,716
More than three years	$128	$124	$1,664	$1,612
More than three years and 52 consecutive Bonus Weeks	$152	$140	$1,976	$1,820

**Formerly required two years of service and 52 consecutive Bonus Weeks*

VISION CARE PROGRAM

Beginning November 1, 1990, HAM will offer a company paid Vision Care Program for associates and their eligible dependents. Coverage includes vision examination, lenses, frames and contact lenses. Information explaining plan features and claim procedures will be mailed to each associate's home during the month of October.

ASSOCIATE STOCK PURCHASE PROGRAM

In this new program, HAM associates may purchase shares of stock in Honda Motor Company in the form of American Depository Receipts (ADRs) with the convenience of payroll deduction. HAM will pay all broker's fees incurred for Honda Motor Company ADRs purchased through payroll deduction. The initial enrollment for the Associate Stock Purchase Program will begin in December. Payroll deduction will begin in January, 1991. HAM associates will continue to receive one ADR from the company upon completion of one full year of associate service as of Dec. 31.

BEST COPY AVAILABLE

GROUP UNIVERSAL LIFE PROGRAM

The optional Group Universal Life Program has been enhanced to permit spouses to apply for up to $100,000 of life insurance coverage regardless of the associate's base pay. Applications for the spouse's insurance will be accepted during the annual Group Universal Life enrollment in October.

PRODUCTION WAGES AND BONUSES: CALCULATING THE TOTAL PACKAGE

The annual compensation package at Honda of America Manufacturing consists of:

- Base hourly wage
- Attendance Bonus
- HAM Bonus Sharing

The following calculation assumes a production associate with perfect attendance and 3 years of service as of June 30 (excluding shift premium and overtime)

	September 7, 1989	**September 6, 1990**
Base wage	$14.20/hour	$14.75/hour
Attendance Bonus	.80/hour (equivalent)	.95/hour
HAM Bonus Sharing*	.77/hour (equivalent)	.82/hour
TOTAL	$15.77/hour	**$16.52/hour**

*paid in November

In addition to wages and bonuses, HAM provides the following benefits, insurance and assistance programs

- Pension Program
- Savings Plan
- Shift premium pay
- 17 paid days off
- Hospital and Surgical Insurance
- Weekly Sickness and Accident Insurance
- Supplemental Accident Insurance
- Major Medical coverage
- Accidental Death and Dismemberment Insurance
- Long-term Disability Insurance
- Life Insurance
- Dental Insurance
- Prescription drug coverage
- Jury Duty pay
- National Guard/military pay
- Bereavement pay
- Vacation pay
- VIP Awards and benefits
- Associate Assistance Program
- Vision Care Program
- Associate Purchase Program
- Sports Center
- Credit Union
- Service Center
- Shares of stock in Honda Motor Co
- Stock Purchase Program
- Call back pay
- Reporting pay
- Social Security (company's contributions)
- Workers Compensation
- Suggestion System
- Education Assistance Program
- Quality Award program
- Special year-end attendance gifts
- Associate service awards
- Uniforms
- Safety shoes and glasses
- Christmas events and gifts
- Safety Award program
- Family Festival

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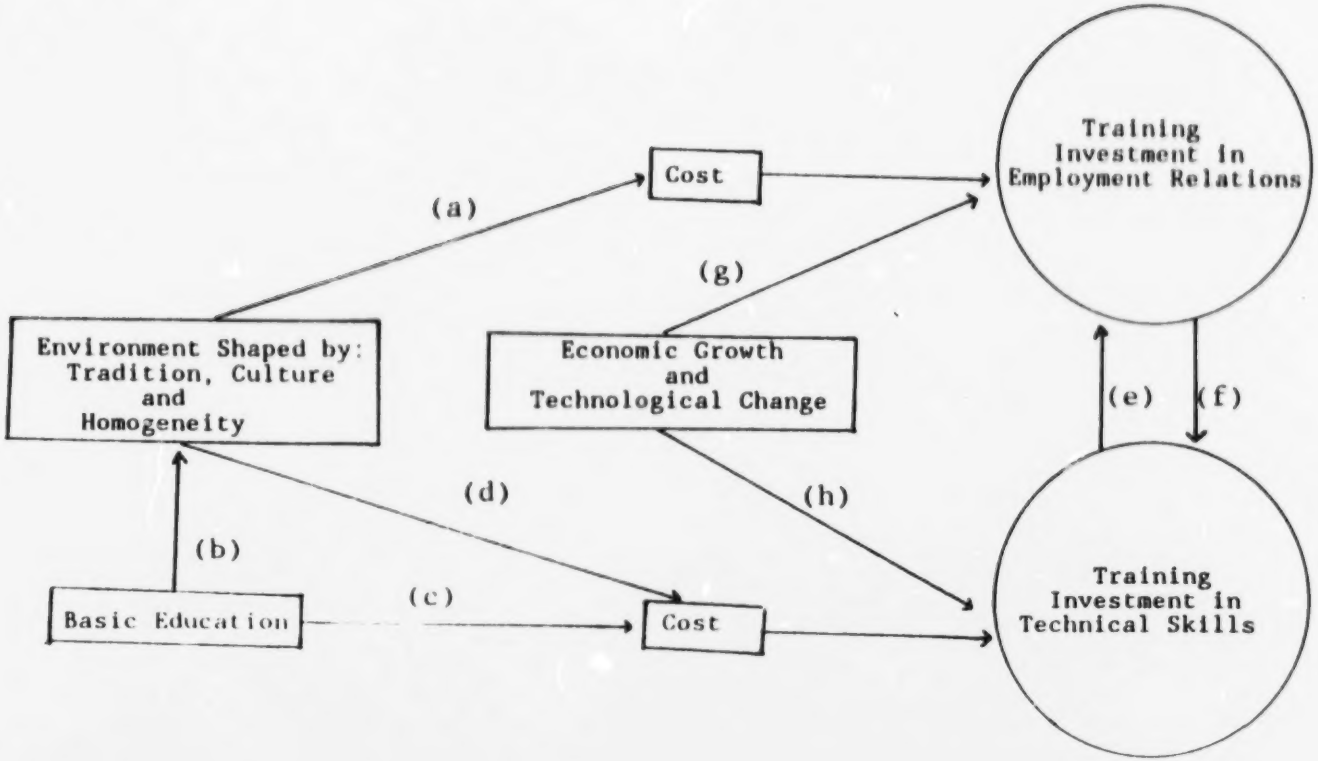
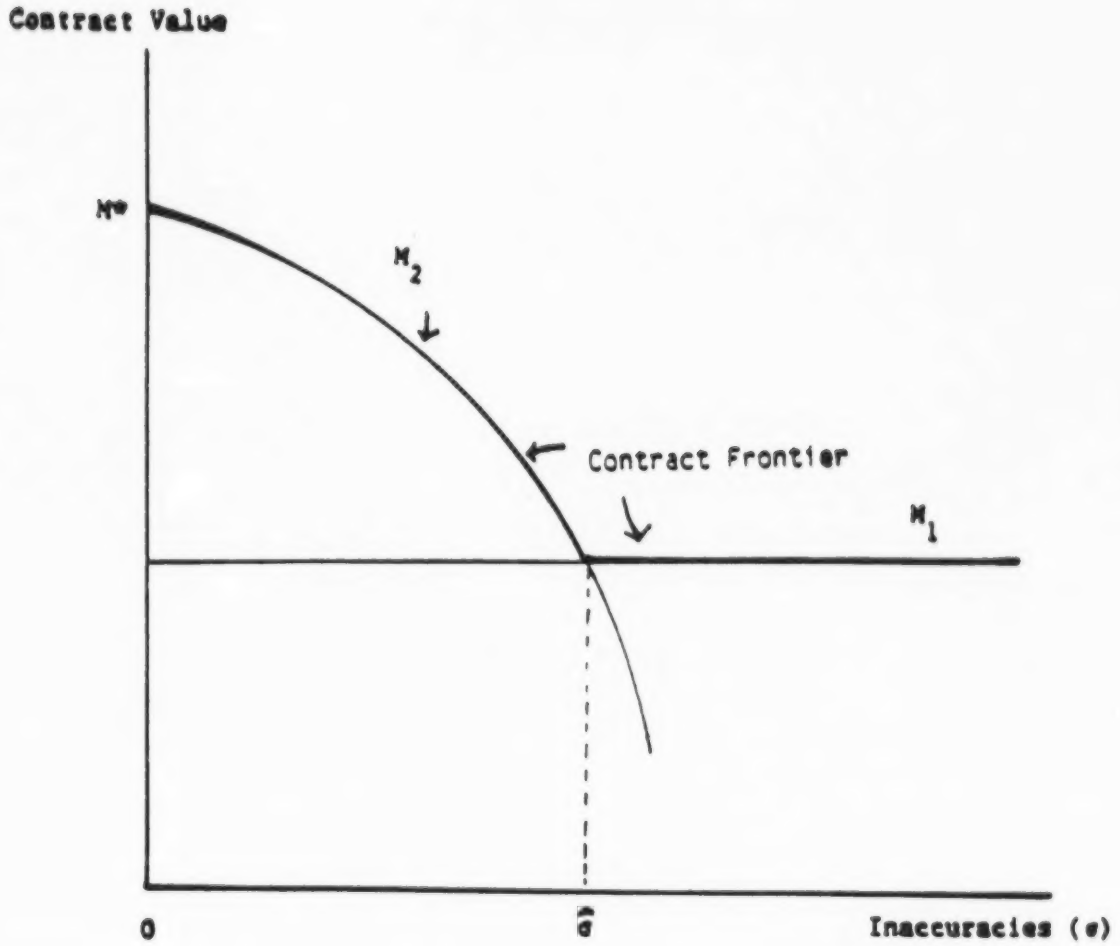


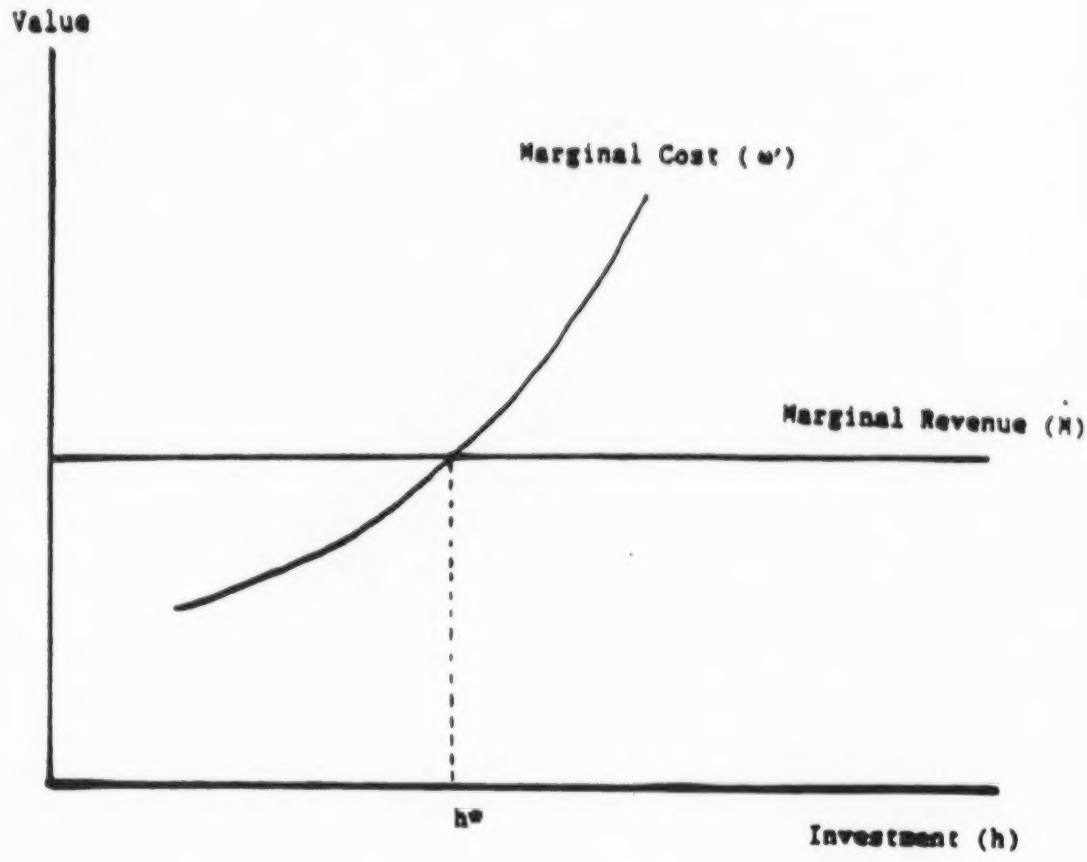
Figure 1: Outline of the Theory of Training Investments

Figure 2



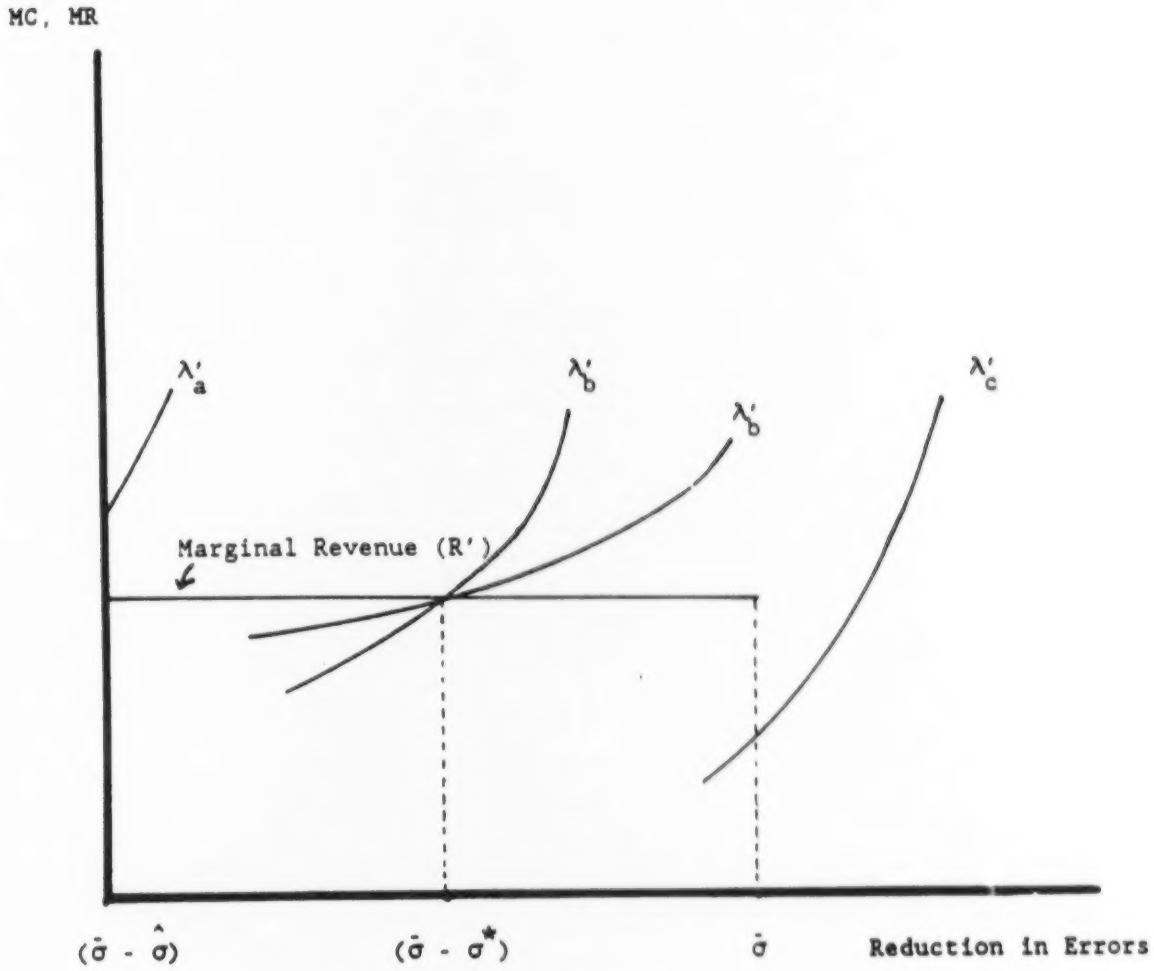
Contract Frontier

Figure 3



Investment in Technical Skills

Figure 4



Investment in Employment Relations (Information Reliability)

Table 1

Formal Training (off-jt) in Japan 1989

	Received Training (1)	(multiple answers) Within 1 year of Employment (2)	Promotion time & Job Rotation Time (3)	Within Recent 2 years (4)
Sex				
Both	75.3 (100)%	(60.5)%	(29.3)%	(48.8)%
Male	80.2 (100)	(59.3)	(33.6)	(50.4)
Female	60.6 (100)	(66.8)	(10.0)	(42.6)
Education				
Junior H.S.	67.7 (100)	(40.9)	(32.1)	(38.4)
Senior H.S.	70.1 (100)	(52.6)	(29.5)	(46.0)
Jr. College	68.9 (100)	(58.3)	(15.9)	(45.0)
University	85.0 (100)	(71.0)	(31.9)	(53.6)
Years of Tenure				
< 5 years	68.1 (100)	80.0	7.2	43.9
5-10	73.3 (100)	63.7	20.1	54.0
10-20	80.4 (100)	52.6	40.8	51.8
20+	83.0 (100)	45.3	51.8	47.3

Notes: This table is based on 6,929 worker respondents.

Source: Japan Ministry of Labor, (Shokugyo Kunren Kyoku), Minkan Kyoiku Kunren Jitai Chosa Hokoku Sho (Report on the Survey of Private Sector Training), 1990, Table 12.

Table 2

Per Employee Indirect Labor Expenses Per Direct Labor Expenses(%)
Japan (1988)

Firm Size/Expenses	All Industries	Manufacturing	Transportation Equipment
All			
Direct Labor	100	100	100
Indirect Labor	19.3	19.5	21.6
Training	0.5	0.4	0.3
Hiring	0.4	0.3	0.2
5,000+			
Direct Labor	100	100	100
Indirect Labor	24.2	23.9	24.2
Training	0.6	0.7	0.3
Hiring	0.2	0.2	0.2
1,000-4,999			
Direct Labor	100	100	100
Indirect Labor	19.2	19.8	18.7
Training	0.5	0.4	0.4
Hiring	0.4	0.3	0.3
300-999			
Direct Labor	100	100	100
Indirect Labor	17.2	17.6	17.4
Training	0.4	0.4	0.4
Hiring	0.4	0.3	0.2
100-299			
Direct Labor	100	100	100
Indirect Labor	16.5	15.8	15.7
Training	0.3	0.3	0.4
Hiring	0.4	0.3	0.4
30-99			
Direct Labor	100	100	100
Indirect Labor	15.9	15.9	20.1
Training	0.3	0.2	0.1
Hiring	0.4	0.3	0.2

Notes: Direct Labor expenses are wages and salaries plus bonus payments. Indirect labor expenses include payments in kind, retirement contributions, legally specified insurance premiums and other payments, training expenses, hiring expenses, expenses for providing uniforms, and others. Training expenses are expenses incurred in running training facilities, payments to instructors, honorariums, etc. Hiring expenses are expenses incurred in advertising opening, administering tests, as well as personnel expenses involved in screening and hiring.

Source: Rodo Horei Kyokai, Rodo Jikan Seido To Rodo Hiyo No Jittai (Hours of Work System and the Status of Labor Expenses), 1989, Table 39.

Table 3

FORMAL TRAINING AT HONDA OF AMERICA MANUFACTURING (HAM) IN 1990

Type	Number of Classes	Number of Associates	Total Training Hours
General	440	5,175	75,000
Fundamental*	30	108	3,553
Voluntary Involvement (VIP)	125	1,013	8,104
Technical	355	3,193	25,000
Technical Development Program Modules**	(Introduced in 1991)		

Notes:

In 1990, there were about 10,000 production associates at HAM. General training develops leadership and communication skills, management techniques, skills for problem solving and decision making, and skills for writing performance appraisals and conducting interviews. Fundamental training develops technical and managerial skills. VIP training teaches how to conduct quality circles, suggestion systems, and safety and quality award systems. (For training in quality control circles, a day is devoted to QC tools, i.e., the use of charts and statistical analyses, how to assess results, another day to advanced problem solving and quality circle training.) Technical training complements an associate's on-the-job training for such basic skills as welding, hydraulics, electrical and mechanical. HAM estimates that 10 to 15 percent of its associates are uninterested in ever taking any of the formal training courses; in other words, they are just there to earn their paychecks.

*Fundamental training is provided to team leaders. The rest of the training programs are for production associates. Ninety-nine percent of the instruction is done by experienced Honda associates. All trainees are paid wages during training; if they take courses during off hours, they are paid overtime pay.

**This new training program, developed at HAM, is more specialized and advanced than the existing technical training, and has 2,000 technical modules, each lasting between one hour and five days. These modules include aluminum machining, assembly, paint, welding, stamping, plastics, casting, and other process oriented training. Trainees will progress through the modules at their own pace. HAM claims that the purpose of these modules is to create a world class engineers out of its associates.

Source: HAM's communications to the author.

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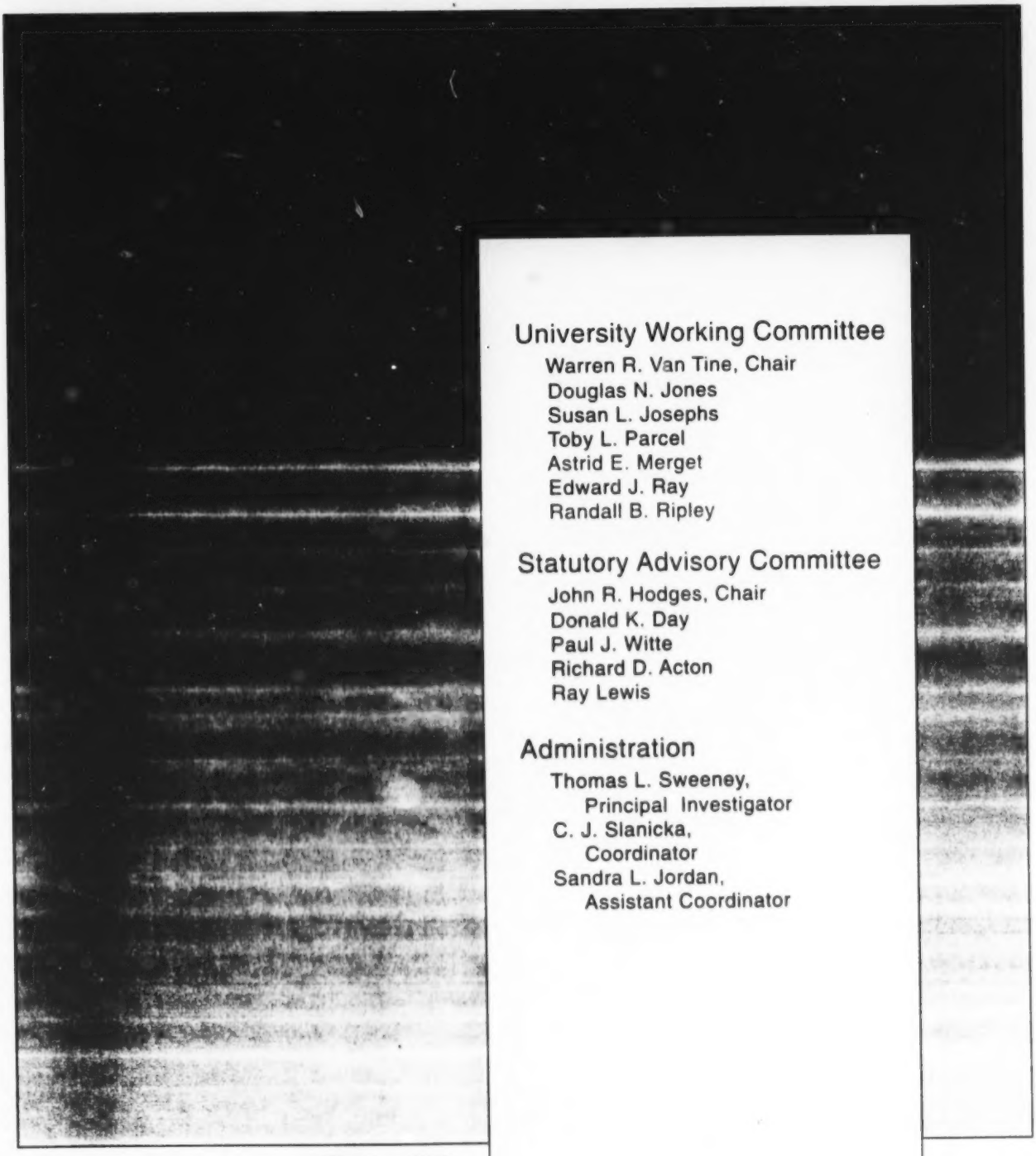

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